

**INSTRUMENTATION AND CONTROL  
GENERAL REQUIREMENTS**

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**1. GENERAL**

**1.1 Requirements of Work**

- .1 Supply, Install, Performance Verification, provide commissioning assistance, and provide warranty for a complete and fully documented I&C system as shown on the Drawings and specified herein. The I&C system will form a subsystem of the overall WTP control system and contains City Supplied Equipment and Vendor Packages as specified in this and other Sections of the Specification.
- .2 Component subsystems of the I&C system will include, but are not limited to, the following:
  - .1 Primary elements and transmitters
  - .2 Final control elements
  - .3 I&C field devices
  - .4 I&C junction boxes, local control panels, and marshalling panels
  - .5 Instrumentation cabling
  - .6 Instrumentation power supplies
  - .7 Conduit and cable tray
  - .8 PLC based control system
  - .9 Analyzer and transmitter manufacturer's configuration and programming software
- .3 The Contractor's responsibility also includes receiving, un-crating, examining for shortages or damage, assembling, field fitting, installing, mounting, wiring, and testing of City Supplied Equipment and Vendor Packages.
- .4 Where packaged, stand-alone control systems are supplied under other Divisions of this Specification, provide cabling to connect to the required remote monitoring and/or controllers. Provide end-to-end Performance Verification of all required remote monitoring and/or controllers. Ensure the correct functionality of any equipment supplied under Divisions 15 and 16.
- .5 Documentation provided by the Contractor shall include as a minimum:
  - .1 Equipment descriptive data.
  - .2 Equipment installation instructions, service manuals, O&M manuals, bills of materials, and recommended spare parts lists.

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- .3 Schematics and interconnection wiring diagrams sealed by a Professional Engineer registered in the Province of Manitoba.
  - .4 Records of conductor identification, field terminals, cable lists, changes, etc.
  - .5 I&C panel Shop Drawings, face layouts, schematics, and point-to-point wiring diagrams sealed by a Professional Engineer registered in the Province of Manitoba.
  - .6 Records of as-built information for the complete instrumentation system.
  - .7 For the PLC based control system, the Contractor shall provide detailed documentation of the system hardware.
- .6 Documentation provided by the Contractor shall be formatted as follows:
- .1 P&IDs – Depict the general intent of the control systems and are to be used as the governing document for the scope of Work.
  - .2 Instrument Index – A sorted index of the detailed information for the devices shown on the P&IDs. The index lists the appropriate support documentation for the devices' supply and installation. The instrument index is the controlling document for the supply of materials.
  - .3 I/O Index – A sorted index of the control system I/O points shown on the P&IDs, giving the supporting documentation as per the instrument index.
  - .4 Instrument Specification Sheets – Detail the relevant data for the supply of devices.
  - .5 Instrument Loop Diagrams – Show interconnections and hook-up of devices. The Contractor shall produce an instrument loop diagram for each device and record all relevant information on each sheet for submission at the completion of the Work. The drawings shall be complete with all terminal and wiring numbers etc.. The Contractor shall provide loop drawings for Vendor packages supplied under any division of these Specifications. For City Supplied Equipment, the City will provide loop drawings showing loop information within the contract limits of the City Supplied Equipment. The Contractor shall complete these loop drawings for City Supplied Equipment by adding all loop information for Materials installed under any division of these Specifications. As they become available a set of 'B' size (11" x 17") AutoCAD drawings and associated files will be made available to the Contractor.
  - .6 Location Drawings – Indicate in plan and/or elevation views where the instrument elements are physically located. These Drawings are provided to assist the Contractor in estimating the amount of cable and ducting required.
  - .7 Standard Details – Provide a reference for installation, operation, and other instructions pertinent to a particular device.

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.8 Detailed Specification – Lists qualifications, quality of materials and workmanship, and supplementary information.

.7 References

.1 This Specification contains references to the following documents. They are a part of this Section as specified and modified. In case of conflict between the requirements of this Section and those of the listed documents, the requirements of this Section prevail.

<u>Reference</u>	<u>Title</u>
<b>API 550</b>	Manual on Installation of Refinery Instruments and Control Systems, Part I – Process Instrumentation and Control Section one (1) through thirteen (13)
<b>ASME BPVC-VIII-1-2004</b>	Rules for Construction of Pressure Vessels
<b>ASTM B68-02</b>	Seamless Copper Tube
<b>ASTM D883-00</b>	Terms Relating to Plastics
<b>IEEE 100-00</b>	Dictionary of Electrical and Electronic Terms
<b>ANSI/ISA-7.0.01 1996</b>	Quality Standard For Instrument Air
<b>ISA 5.4-1999</b>	Instrument Loop Diagrams
<b>ISA S18.1-79(1992)</b>	Annunciator Sequences and Specifications
<b>ISA S51.1-79(1993)</b>	Process Instrumentation Terminology
<b>NEMA 250-2003</b>	Enclosures for Electrical Equipment (1000V Max)
<b>NEMA ICS 1-00(R2005)</b>	General Standards for Industrial Controls and Systems
<b>NEMA ICS 2-2000</b>	Industrial Control and Systems, Controllers, Contactors
<b>CEC C22.1-06</b>	<b>Canadian</b> Electrical Code
<b>SAMA PMC 17-10-63</b>	Bushings and Wells for Temperature Sensing Elements
<b>UBC-88</b>	Uniform Building Code
<b>UL 1012-05</b>	Power Supplies
<b>UL 94-06</b>	Tests for Flammability of Plastic Materials for Parts in Devices and Appliances

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**Weik, Martin H.**

Communications Standard Dictionary, Van Nostrand  
Reinhold Co., 1983

.8 Related Work

.1 Mechanical: Division 15

.2 Electrical: Division 16

.9 Codes, Rules, Permits and Fees

.1 Give all required notices, submit Drawings, obtain all permits, licenses, and certificates, and pay all fees required for this Work.

.2 Furnish a certificate of final inspection and approvals from inspection authorities to the Contract Administrator.

.10 Qualifications

.1 The instrumentation Subcontractor shall be a firm normally engaged and fully competent in the type of Work described in this Section of the Specification. The firm shall have been continuously and successfully engaged in this business for at least five (5) years.

.2 Qualified journeyman instrument mechanics that are familiar with the devices being installed shall perform all instrument hook-ups, calibrations, and checkouts.

.3 Qualified journeyman electricians shall perform all control wiring installation and connections.

.11 Standards of Workmanship

.1 Arrange and install products to fit properly into designated building spaces.

.2 Install products in accordance with the recommendations and ratings of the product Manufacturers.

.3 Supply and execute installation of all instrumentation control tubing in accordance with Section 17140 – Instrument Air Supply and Transmission.

**1.2 Equipment**

.1 Receiving, storing, and protection of components during construction:

.1 Examine each component upon delivery to Site. Report all damage noted to the Contract Administrator prior to accepting or rejecting delivery. All instrumentation primary elements, control components, panels, etc. shall be placed in a secure, dry,

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heated storage building. Maintain the space temperature above 10°C and the space relative humidity below 50%.

- .2 Perform a preliminary examination upon delivery to ensure that:
  - .1 All I&C components supplied for work carried out under this Section of the Specifications comply with the requirements stated in the instrument specification sheets.
  - .2 All I&C components supplied under other Sections of these Specifications, to be connected to I&C components supplied under this Section of the specifications, comply with the requirements stated in the Contract Documents.
  - .3 Itemize all non-conformities noted above and forward them to the Contract Administrator. Any delays in construction resulting from the delivery to Site of non-conforming I&C components shall be borne by the Contractor.
  - .4 Do not install primary elements or other sensitive equipment until construction is sufficiently completed to provide an "operating condition" environment. Notify the Contract Administrator prior to installing any equipment of this type.
  - .5 Ensure that covers where required are properly installed on all equipment. Provide all covers, padding, guards, etc. as required to guard any equipment against damage.
- .2 Take all necessary precautions to ensure that equipment is supplied free of damage. If deemed necessary by the Contract Administrator, damaged equipment shall be replaced with new product at no additional cost to the City. The Contractor shall bear any costs due to construction delays resulting from the delay in delivery of acceptable equipment.

**1.3 Documentation**

- .1 Submittals
  - .1 Submit Shop Drawings for all products supplied by this Division. Submit Shop Drawings for review prior to purchase of any products or equipment and sufficiently in advance to allow ample time for checking.
  - .2 Contractor to review, modify, and approve the Shop Drawings prior to submitting Shop Drawings to the Contract Administrator for review. Contractor approval of a Drawing indicates the following:
    - .1 The Drawing has been checked by the person making the approval.
    - .2 The equipment or material complies in all respects with the requirements of the Specifications and Drawings.

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- .3 The quantities indicated are correct.
  - .4 The physical dimensions of the components are such that they can be installed without interference with the building structure or other equipment, and after installation, there are sufficient clearances on all sides for maintenance, servicing and operation of the equipment.
  - .5 The points of attachment are clearly indicated, i.e. TOP, BOTTOM, SIDE, etc.
  - .6 The arrangement and location are properly oriented.
  - .7 The product is suitable for its intended use.
  - .8 The submission consists of sufficient information to adequately convey the scope of supply and the specific product to be supplied is highlighted.
  - .9 The submission contains sufficient information to install the equipment or systems.
- .3 Stamp and sign the Shop Drawing to show approval, indicating the above has been complied with. If Contractor revisions are too extensive, return the submission to the Manufacturer for revision, then repeat the Shop Drawing approval process before submitting to the Contract Administrator.
  - .4 Manufacture of products shall conform to Shop Drawings marked as reviewed by the Contract Administrator and returned to the Contractor.
  - .5 Keep one (1) complete, maintained set of Shop Drawings at the Job Site during the construction period. Record modifications and changes as they arise during the construction period and incorporate these changes in the Record Drawings.
  - .6 Refer to Division 1 for further information on Shop Drawing submittals.
- .2 O&M Manuals
    - .1 Refer to Division 1 for general O&M manual submittal information.
    - .2 In addition to the requirements specified in Division 1, provide the following information:
      - .1 Table of Contents – Arrange contents sequentially by systems under section numbers. Label tabs of dividers between each to match section numbers in the Table of Contents.
      - .2 Systems Descriptions – A brief synopsis of each system typed and inserted at the beginning of each section. Include sketches and diagrams where appropriate.

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- .3 O&M instructions of all equipment and controls – These operating instructions need not be Manufacturer's data but may be typewritten instructions in simple language to guide the City in the proper O&M of this installation.
  - .4 A copy of all wiring diagrams complete with wiring coding.
  - .5 Include type and accuracy of instruments used.
  - .6 Set of final reviewed Shop Drawings.
  - .7 Provide a tabulated list of all consumables utilized (fuses, lamps, etc.) indicating where used, type, rating and reorder details.
- .3 Record Drawings
- .1 Maintain On-Site a complete set of Record Drawings.
  - .2 In addition to the requirements stated in Part E12, record the following information on the Drawings:
    - .1 all changes alterations or additions
    - .2 all instrumentation cable and control tubing
    - .3 all changes to the numbers and location of outlets, motors, panels and end devices that may occur during the course of the Work.
  - .3 Before requesting the Certificate of Total Performance, make any necessary final corrections to the Record Drawings, sign each print as a certification of accuracy and deliver all sets to the Contract Administrator for approval.

**2. PRODUCTS**

**2.1 General**

- .1 Refer to the requirements of Division 1.
- .2 Selected Products:
  - .1 The design is based on the use of the first named product where multiple products have been listed.
  - .2 The instrument Manufacturer's listed within this Division have been compiled into the list of acceptable instrument Vendors that is included in the Appendix A. Please refer to Division 11 for process specific analyzers not included in this list.

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.3 Quality of Products:

- .1 All products provided should be CSA approved, ULC approved where applicable, and new unless otherwise specified.
- .2 If products specified are not CSA approved, obtain special approval of the relevant provincial regulatory authority. Pay all applicable charges levied and make all modifications required for approval.
- .3 Products provided, if not specified, shall be new, of a quality best suited to the purpose required and their use subject to approval by the Contract Administrator .

.4 Uniformity of Manufacture

- .1 Unless otherwise specifically called for in the Specification, uniformity of manufacture to be maintained for similar products throughout the Work.

.5 Product Finishes

- .1 Contractor to specify proposed finishes to be used for Contract Administrator's review.

.6 Use of Products During Construction

- .1 Any equipment used for temporary or construction purposes is to be approved by the Contract Administrator. Clean and restore to "as new" condition all equipment prior to the time of Substantial Performance.

**2.2 Instrumentation**

.1 General

- .1 Instruments are to be suitable for the environmental conditions in which they are to be installed.
- .2 Determine where injurious conditions may be expected to occur and make proper provision to protect the instruments to ensure their proper and reliable operation.
- .3 Provide power surge protection, heating cables, and devices to protect instruments, equipment, and lines from being functionally impaired or damaged by power surges or environmental conditions such as moisture or freezing.

**2.3 Identification**

- .1 Refer to Division 16 for general identification requirements. Provide lamacoid nameplates with 6 mm black lettering on white background. Identify the loop tag number (where applicable) and the device name, function, and instrument range or setpoint value on the nameplate.



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- .2 Where it is not possible to attach a lamacoid nameplate to a field instrument component, provide the component with a stainless steel metal tag firmly wired to the device and identified with the loop tag number.
- .3 Identify all wires where they terminate at the marshalling panels, junction boxes, control panels, and field devices with a heat shrink sleeve with machine printed labeling.
- .4 Clearly mark all panels, pull boxes, junction boxes, etc. to indicate the nature of service.
- .5 Provide neatly typed circuit directories for panel power distribution systems to indicate loops or devices powered by the circuit and the fuse size.
- .6 Identify all exposed control conduits at all pull box locations, where the conduits enter or leave a room, and 13 m on centre throughout the room. This shall apply to conduits above removable ceilings. Use Thomas & Betts TY-RAP 5532-M labels for conduit identification.
- .7 For direct current wiring use black for positive and white for negative.
- .8 For thermistor wiring to motors use red and blue coloured insulated wire.

**3. EXECUTION**

**3.1 Coordination With Other Divisions**

- .1 Examine the Drawings and Specifications of all Divisions and become fully familiar with the Work. Before commencing Work, obtain a ruling from the Contract Administrator on any conflicting issues between Divisions. No compensation will be made for any costs arising from conflict not identified before Work has commenced.
- .2 Coordinate the Work to be performed under this Section of the Specification with all Divisions installing equipment to ensure that there are no conflicts.
- .3 Install anchors, bolts, pipe sleeves, hanger inserts, etc. required in ample time to prevent delays to installation Work.
- .4 Lay out the Work and equipment with due regard to architectural, structural, and mechanical features. Architectural and structural Drawings take precedence over electrical Drawings regarding locations of walls, doors, and equipment.
- .5 Structural members shall not be cut without prior approval of the Contract Administrator.
- .6 Examine previously constructed work and notify the Contract Administrator of any conditions which prejudice the proper completion of this Work.

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**3.2 Product Handling**

- .1 Use all means necessary to protect the products included in this Division before, during and after installation, and to protect products and installed Work of all other trades.
- .2 Any damage to the products and/or installed Work shall be repaired or replaced to the approval of the Contract Administrator by the Contractor.
- .3 Remove advertising labels from all products installed that have such labels attached. Identification or CSA labels are not to be removed.
- .4 Remove dirt, rubbish, grease, etc. resulting from Work performed under this Division of the Contract from all surfaces.

**3.3 Separation of Services**

- .1 Maintain separation between the electrical wiring system, piping, ductwork, and the instrumentation cables so that each system is isolated (except at approved connections to such systems) to prevent galvanic corrosion. In particular, contact between dissimilar metals, such as copper and aluminum, in damp or wet locations is unacceptable.
- .2 Do not support wiring from pipes, ductwork, etc. Hangers for suspended ceilings may be used for the support of wiring only when approval is obtained from the Contract Administrator and the ceiling installer, and only if approved clips or hangers are used.
- .3 Classifications of Circuits
  - .1 The circuit categorization shall of first priority follow Canadian Electrical Code with respect to separation for electrical safety and the following shall apply with respect to electro-magnetic compatibility:

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Very Noisy	High voltage circuits and their associated grounding
	High current (>200 A) LV circuits.
	Harmonic-rich LV circuits.
	DC circuits: un-suppressed or above 50 V.
Noisy	Low current class two (2) circuits.
	Medium power pulsed or radio frequency circuits.
Indifferent	ELV digital status circuits.
	Intrinsically safe circuits.
	Telecommunications circuits.
	Fire alarm and emergency lighting circuits (note that some fire alarm circuits may fall into the category of signal circuits).
	Any other emergency, shutdown, or high integrity circuit (e.g. toxic gas alarm).
Sensitive	Analogue signal circuits.
	Data communication circuits.
Very Sensitive	Low level voltage and current signals (e.g. from instrument sensors).

.4 Separation of Circuits

- .1 This Section relates to the running of cables carrying differing types of circuit in close proximity to one another and to other services. Sensitive circuits shall normally be run in overall shielded cable. Very sensitive circuits shall normally be run in individually twisted pair shielded cable.
- .2 For cables sharing the same support/containment system, the following shall provide guidance to minimize extraneous interference.

<b>Segregation between circuits</b>	<b>Very Noisy</b>	<b>Noisy</b>	<b>Indifferent</b>	<b>Sensitive</b>	<b>Very Sensitive</b>
Very Noisy	Thermal grouping as per CE Code.	150 mm	300 mm	300 mm	300 mm
Noisy	150 mm	Thermal grouping as per CE Code.	150 mm	150 mm	150 mm
Indifferent	300 mm	150 mm	Separation of circuit types.	100 mm	100 mm
Sensitive	300 mm	150 mm	100 mm	Touching	50 mm
Very Sensitive	300 mm	150 mm	100 mm	50 mm	Touching

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**3.4 Wire and Cable**

- .1 Refer to Section 17124 – Instrumentation Cable.

**3.5 Equipment Connections**

- .1 Prior to the connection of signal wiring to process control and instrumentation devices, check the device voltage rating and polarity for compatibility with the corresponding loop and/or schematic diagram. Where device and circuit characteristics are found to be incompatible, the connections are not to be made. Report the condition immediately to the Contract Administrator.
- .2 All control wiring diagrams illustrate typical control circuits applicable to the type of equipment specified. Control circuits may vary with different manufacturer's equipment. Verify all control circuits with the Manufacturers of the equipment and make any corrections to the control wiring diagrams that may be required.
- .3 Provide power disconnect terminals in marshalling panels for all devices and PLC I/O sourced from the panel. Provide local power disconnect switches for all 120 VAC power instruments. Mount adjacent the instrument.
- .4 Provide a disconnecting means in the cable connecting each ultrasonic transponder to the transmitter. This disconnect shall consist of a terminal strip in a local water proof junction box.

**3.6 Wiring to Equipment Supplied by Others**

- .1 Equipment supplied by the City or as part of a Vendor Package, that has external or field mount control devices, are to be installed and wired by the Contractor. The equipments performance shall also be verified by the Contractor.

**3.7 Access Panels**

- .1 Provide access panels where I&C system junction boxes are concealed. Panels to be of adequate size for servicing of the concealed junction box and complete with necessary frames and hinged doors held closed with captive fasteners.
- .2 In removable ceiling areas provide markers on ceiling tile to locate equipment requiring access. Use a 25 mm diameter blue circle painted on the access panel to indicate that it is for instrumentation and control system access.

**3.8 Instrument Mounting Stands**

- .1 Supply and install instrumentation mounting stands as required. Stands are to be either floor or wall mounted. The mounting stands are to be fabricated from aluminum or galvanized steel.

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- .2 Supply and install protective drip shields for any exterior stand-mounted instrumentation equipment. The drip shield is to extend 50 mm at the top and sides from the front face of the equipment. The drip shield is to be fabricated from aluminum.

**3.9 Sealing of Wall and Floor Openings**

- .1 Seal all conduit and cable entries passing through outside walls of buildings, through partition walls separating electrical rooms from other areas, through fire separations, and through floors above grade.
- .2 Seal openings after all wiring entries have been completed.
- .3 Sealing material shall be fire resistant and not contain any compounds which will chemically affect the wiring jacket or insulating material. Cable penetrations through fire separations, if required, are to be sealed. Acceptable methods are Canstrut "Fire Stop", Electrovert "Multi-Cable Transit" or Dow Corning RTV Silicone Foam.

**3.10 Sleeves**

- .1 Provide sleeves of galvanized steel pipe with machine cut ends of ample size to accommodate conduits passing through walls, partitions, ceilings, floors, etc.
- .2 For wall partitions and ceilings the ends shall be flush with the finish on both sides. For floors, the ends shall extend 100 mm above finished floor level.
- .3 Fill the space between the sleeve and the conduit with fire stop material and caulk around the top and bottom with approved permanently resilient, non-flammable and weatherproof silicone base compound. Ensure that the seal is compatible with the floor and ceiling finishes.
- .4 Locate the sleeves and position exactly prior to construction of the walls and floors.
- .5 Failure to comply with the above requirements shall be remedied at the Contractor's expense.

**3.11 Connections to Mechanical, Electrical and Existing Systems**

- .1 Refer to Division 16 for the required tie-in procedures.

**3.12 Tagging Standards for Devices and Wiring**

- .1 Tag all devices, wires, and I/O using the assigned loop, equipment, or device tag name. Where tag naming and numbering is not specified, the Contract Administrator will provide naming and numbering that is consistent with the WTP naming conventions.

**3.13 Testing of Instrumentation Loops**

- .1 After all devices within a loop have been connected, check the loop for correct functioning and interaction with other loops, where applicable. Provide written notice to the Contract

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Administrator when the loops are going to be tested so that the tests may be witnessed at the Contract Administrator's discretion.

- .2 Check the operation of final control elements such as solenoid valves, actuators, etc. by manual control before checking with automatic control.
- .3 Check and simulate all alarms and shutdown functions.
- .4 Verify the status of all points connected or accessible to the WTP control and monitoring system.
- .5 Where applicable, test all tubing for leaks in compliance with the ISA RP7.1. Isolate all instruments when tubing is being tested to protect against over pressure.
- .6 Perform tests and record results on the test data forms that are included in this Section. Develop additional and/or more detailed test forms as necessary to suit more complex instrumentation.
- .7 Sign and date all test reports. Submit the test reports to the Contract Administrator within five (5) Business Days of testing.

**3.14 Calibration**

- .1 Instruments are to be factory pre-calibrated. Verify calibration after installation for all instruments installed under these Specifications. Provide a printed record of the factory calibration parameters for "smart" devices.
- .2 Prior to calibration, completely program all "smart" transmitters including entries of the appropriate range and tag number. Provide a printed record of smart device serial numbers against their assigned tag number.
- .3 Instruments are to be set up and calibrated by an accredited instrument technician working under the approval of the instrument Manufacturer.
- .4 Calibrate all instruments to an accuracy of 0.5% of full range, or to the manufacturer's stated accuracy of the instrument whenever an accuracy of 0.5% is not achievable.
- .5 Perform the following applicable calibration verification for each instrument and its associated signal conditioning equipment:
  - .1 Calibrate all inline flow meters by a draw-down test.
  - .2 Calibrate all density meters by lab samples.
  - .3 Calibrate all vacuum and pressure instruments by manometer or accurate test instrument and hand test pump.
  - .4 Calibrate gas detectors using standard gas samples.

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- .5 Calibrate temperature instruments against a standard lab thermometer.
- .6 Online analyzers with known samples.

**3.15 Test Forms**

<b><u>Form No.</u></b>	<b><u>Title</u></b>
.1 ITR	Instrument Test Report.
.2 LCR	Loop Check Report.

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**INSTRUMENT TEST REPORT**

**FORM NO. ITR**

SYSTEM: \_\_\_\_\_  
 SERVICE: \_\_\_\_\_ TAG NO.: \_\_\_\_\_  
 LOCATION: \_\_\_\_\_  
 MAKE: \_\_\_\_\_ MODEL: \_\_\_\_\_  
 SERIAL NO.: \_\_\_\_\_ CSA: \_\_\_\_\_  
 ELEMENT: \_\_\_\_\_ RANGE: \_\_\_\_\_  
 DESIGN SETTING/RANGE: \_\_\_\_\_ CONTACT TO: \_\_\_\_\_ ON: \_\_\_\_\_  
 SIGNAL IN: \_\_\_\_\_ OUT: \_\_\_\_\_ ASSOCIATED INSTRUMENT: \_\_\_\_\_  
 INSTRUMENT CONDITION: \_\_\_\_\_ CONFORM TO SPEC: \_\_\_\_\_  
 PROJECT NO: \_\_\_\_\_ DATA SHEET: \_\_\_\_\_

	TEST 1				TEST 2			
TEST METHOD	INPUT		OUTPUT		INPUT		OUTPUT	
	INC.	DEC.	INC.	DEC.	INC.	DEC.	INC.	DEC.
TEST POINT 1								
TEST POINT 2								
TEST POINT 3								
TEST POINT 4								
TEST POINT 5								
COMMENTS								
GRAPHS								

TESTED BY: \_\_\_\_\_ CHECKED BY: \_\_\_\_\_

DATE: \_\_\_\_\_ DATE: \_\_\_\_\_



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**LOOP CHECK REPORT FORM NO. LCR**

- CHECKED OUT OK  
 NOT APPLICABLE  
 FURTHER ACTION REQUIRED

	INSTRUMENT TAG NO.							
LOOP NO. _____								
SHEET NO. _____								
P & I DWG. NO. _____								
<b>INSTALLATION COMPLETE</b>								
Primary Element.								
Impulse Lines.								
Block and Drain Valves.								
Air Supply/Filter/Reg.								
Wiring.								
Tracing/Insulation/Housing.								
Mounting and Location.								
PLC/SCADA I/O & Status.								
<b>CALIBRATED</b>								
Impulse Lines Press. Tested.								
<b>LOOP CHECKED</b>								
Element to Receiver.								
X Mtr. To Receiver.								
X Mtr./Trans. to Receiver.								
X Mtr./Trans. to Switches.								
Switches to Annunciator.								
Interlocking Circuit.								
Controller to Valve.								
Controller Action D or R.								

REMARKS:

**READY FOR START-UP**

Date: \_\_\_\_\_

Installed by: \_\_\_\_\_

Checked by: \_\_\_\_\_

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**3.16 Installation and Performance Testing**

- .1 Refer to the requirements of Division 1 for additional requirements.
- .2 Inspections
  - .1 Provide two (2) weeks' written notice to the Contract Administrator prior to energizing any system to allow for inspection by the Contract Administrator of the following:
    - .1 Proper mounting.
    - .2 Proper connections.
- .3 During Performance Verification, demonstrate to the Contract Administrator proper calibration and correct operation of instruments and gauges.
- .4 Performance Verification of the I&C system is to include but not be limited to the following:
  - .1 Verify installation of components, wiring connections, and piping connections.
  - .2 Supervise wiring continuity and pipe leak tests.
  - .3 Verify instrument calibration and provide written reports.
  - .4 Function check and adjust the I&C equipment under operational conditions.
  - .5 Coordinate manufacturer's service personnel as required for complete system testing.
  - .6 Instruct City personnel in correct method of I&C equipment operation.
  - .7 Direct City personnel at hand-over as to final adjustment of the system for correct operation of WTP.
  - .8 Ensure that the Manufacturer's representatives cooperate to complete the Work of this Section.
  - .9 Verify signal levels and wiring connections to all I&C equipment.
  - .10 Coordinate and cooperate with City staff and the Contract Administrator during the Commissioning Period to commission the interface between the WTP SCADA and the PLC based control system.

**3.17 Training**

- .1 Provide training, in the proper operation and maintenance of all control devices, control valves, and ancillary instrumentation described under this Division of the Specifications.

**END OF SECTION**

**SCOPE OF INSTRUMENTATION AND CONTROL WORK**

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**1. GENERAL**

- .1 Supply and installation of all material, equipment, wiring and labour necessary for the installation of the systems detailed on the Drawings in accordance with the Specifications and the latest edition of the Canadian Electrical Code.

**2. WORK INCLUDED**

**2.1 Related Work**

- .1 Supply and installation of I&C equipment required to operate the WTP including the WTP control system PLC equipment and all Vendor Packages and City Supplied Equipment as indicated on the P&ID'S and in these Specifications.

**2.2 General Requirements**

- .1 Shop Drawings
- .2 Record Drawings
- .3 O&M Data

**2.3 Specific Requirements**

- .1 Supply, install, test, and verify the performance of all instrumentation, components, materials and ancillary equipment covered under Division 17 of this Contract.
- .2 Provide all local control panels for rail car and road tanker unloading as shown on the Drawings.
- .3 Provide all HVAC and steam raising plant interfaces as shown on the drawings.
- .4 Where shown on P&IDs and/or indicated in valve schedule provide local control panel for electrical valve actuators.
- .5 Provide all control system communications equipment as shown on the drawings listed and as described in Specification Section 17275 – Miscellaneous Panel Devices.
- .6 Terminate all spare fibre optic cores to patch panels at each drop point and label accordingly.
- .7 Provide local control panels to house all PLC components and ancillary equipment, and to act as a marshalling panel for signals from instrumentation and equipment covered under Division 17.
- .8 Supply redundant 24 VDC Power supplies installed within the local control panels whenever 24 VDC power is required.
- .9 Provide power-conditioning equipment within each local control panel.

**SCOPE OF INSTRUMENTATION AND CONTROL WORK**

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- .10 Connect the healthy/fault status dry relay contacts from all power conditioning and UPS equipment to local PLC inputs.
- .11 Provide Ethernet connections from the following equipment to the WTP control system: VFDs, transformer power meters, neutral grounding resistors, switchgear protection relays, and large motor protection relays.
- .12 Hardwire I/O signals from the WTP control system PLCs to process instrumentation, HVAC/BMS system, Power Conditioning and UPS equipment and fire alarm panels.
- .13 All WTP control system PLC programming and WTP monitoring system HMI software development shall be performed by others.
- .14 Coordinate with the Supply Contractors of City Supplied Equipment under other contracts but installed under this Contract to install, test and verify performance of the systems shown on the P&IDs.

**2.4 Additional Requirements**

- .1 Provide all necessary testing, detailed wiring continuity checks, installation integrity checks, equipment functional operation checks, and written system verification reports to provide a complete system that is ready for commissioning.
- .2 Provide Performance Verification and commissioning assistance of all systems included in the Contract Documents.

**2.5 Materials**

- .1 Cables and bus support systems, which are intended to enclose or support all forms of electrical conductors used for any purpose covered by this scope. This includes cable trays, raceways and all forms of rigid, flexible, metallic and non-metallic conduit, and including conduit for communication systems.
- .2 Control panels associated with any electrical equipment covered under this Section of Work.
- .3 Circuit breakers of all types and for all applications associated with electrical equipment, which receives its power supply from the main, auxiliary or emergency (including UPS) system.
- .4 Grounding systems, as required by the Canadian Electrical Code, or as otherwise specified.
- .5 Fibre optic patch panels and industrial Ethernet switches as shown on the Drawings and specified herein.
- .6 Electronic data processing and transmission systems, including auxiliary equipment, interfaces and components.

**END OF SECTION**

## ENCLOSURES

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### 1. GENERAL

#### 1.1 References - General

- .1 Equipment, products, and execution must meet all requirements detailed in Section 17010 – Instrumentation and Control General Requirements.

### 2. PRODUCTS

#### 2.1 General

- .1 Unless otherwise specified, provide outside finishes on all enclosures in ANSI 61 Grey as specified in Division 9.
- .2 The enclosures must be suitable for carrying the weight of the equipment mounted inside the panel and on the doors without any warpage.

#### 2.2 Enclosures

- .1 Provide EEMAC type 12 gasketed enclosures in MCC rooms and control rooms.
- .2 All enclosures for mounting outside of MCC rooms and control rooms to be EEMAC Type 4, watertight except where otherwise specified.
- .3 Provide EEMAC 7/3R enclosures for equipment in and around classified areas such as sumps.
- .4 Enclosures for certain equipment in corrosive atmospheres to be EEMAC 4X approved for the classification (e.g. chemical cleaning).
- .5 Enclosures for mounting field control indicator lamps and switches in unclassified areas to be Allen Bradley model 800T-xTZ die cast enclosures.
- .6 Enclosures for mounting field control indicator lamps and switches in Class 1 areas to be Allen Bradley model 800H-xHHX7 cast aluminum enclosures.

#### 2.3 Panel Enclosures

- .1 Fabricate panel enclosures from 11 gauge steel panels complete with necessary stiffening to form a rigid free-standing line-up. The structures must be suitable for carrying the weight of the equipment mounted inside the panel and on the doors. Provide removable top and bottom cable entry plates.
- .2 Provide panels with front access only. Doors shall be key lockable and fitted with 3-point heavy duty latching assemblies. Provide a continuous piano hinge and a pneumatic hold open device on each door.

## ENCLOSURES

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- .3 Finish the interior of the enclosure with white paint. Provide a switched fluorescent light fixture and 120 VAC duplex convenience receptacle inside the enclosure.

### **2.4 Marshalling and Control Panels**

- .1 Supply, fabricate, checkout, layout, document and deliver to Site fully equipped and functional panels.
- .2 Supply all components contained on or within the panels fully wired under this Section of the Specification.
- .3 The selection of all accessories, materials, and methods for fabrication not covered by this Specification, but which are necessary to complete the fabrication of the control panels, is the responsibility of the Contractor.
- .4 Fans and filters shall be installed to pressurize all control panels thus discouraging dust accumulation and providing air purging for temperature and corrosion control.
- .5 Control panel layouts and wiring diagrams are to be provided by the Contractor as Shop Drawings.

### **2.5 Network Cabling Termination Cabinets**

- .1 Double hinged wall mounted cabinet for 19 inch rack mounted equipment.
- .2 NEMA 12 cabinet with glass door and locking wing knobs.
- .3 Cabinet to house fibre patch panel, Cat 5E patch panel and Ethernet switches.
- .4 Provide 120 VAC duplex receptacle and power bar with minimum six outlets.
- .5 Provide horizontal wire management under each patch panel and Ethernet switch.
- .6 Provide vertical wire management on one side.
- .7 Provide blank panels for all empty rack units.
- .8 Provide shelf 3U for mounting equipment.
- .9 Cabinet sized for 26 rack units.
- .10 Hoffman ProTek DH Type 12, or approved equal.

### **2.6 Wiring and Accessories**

- .1 Provide wiring inside the panels according to the following Specifications:
  - .1 Control wiring to be a minimum of #16 AWG tinned stranded copper; insulation rated at 600 V.

## ENCLOSURES

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- .2 Wiring for power distribution shall be a minimum of #14 AWG tinned stranded copper; insulation rated at 600 V.
- .3 Install cables in accordance with the requirements of Division 16.
- .2 Tag each wire at both ends with a heat shrink sleeve that is machine printed. Allow approximately 20 mm of wire insulation between the tag and the bare wire.
- .3 Wiring systems with different voltage levels or types shall be suitably segregated within the panel, according to relevant electrical codes.
- .4 Run all wiring in enclosed plastic wire ways such as Panduit. Size all wire ways so that the total cross sectional area of the insulated wire and cable does not exceed 40% of the cross sectional area of the wire way.
- .5 Provide a minimum clearance of 50 mm between wire ways and any point of wire termination.
- .6 Terminate all wiring including spares, incoming and outgoing, at terminal strips mounted inside the panels. Identify each terminal strip with a terminal strip number, defined as follows:
  - .1 Wire identification to use the connected field device tag name with the wire's corresponding end device terminal number appended to it.
  - .2 Identify every joint and/or terminal of the above wire run with the same identifier.
  - .3 For example, pressure transmitter PT-O100A located in the field has a 1 PR-TPSH cable connected to it. The cable runs through a junction box to a marshalling panel. The wire identifiers for the pair of wires would be PT-O100A all the way to the marshalling panel.
  - .4 Identify spare wires by using the cable tag, terminal number and an "-SP" suffix.
  - .5 Arrange wiring on terminal blocks such that all internal panel wiring terminates on the inboard side of the terminal blocks and all external wiring terminates on the outboard side.
- .7 Provide two (2) sources of 120 VAC power to each control panel: UPS power for critical loads and non-UPS power for non-critical loads. Provide separate critical and non-critical 120 VAC power distribution systems and a 24 VDC power distribution system in each panel. Provide a thermal magnetic circuit breaker on each main power circuit and a fused terminal block for each branched circuit off the main.
- .8 Provide disconnect type terminal blocks Weidmuller WTR 4 series to isolate field wiring that is powered sourced from the panel. Provide a dedicated fused disconnect type terminal block to isolate each individual PLC input and output.

## ENCLOSURES

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- .9 Provide sufficient terminals so that not more than two (2) wires are connected under the same terminal. Provide 20% spare terminal capacity at each terminal block assembly.
- .10 Terminals shall be Weidmuller W Series color coded as follows:
  - .1 Red = positive 24 VDC
  - .2 Black = analog signal plus
  - .3 White = analog signal common and VAC neutral
  - .4 Grey = 120 VAC
  - .5 Green = ground
  - .6 Yellow = shield
- .11 Provide nameplates for each device on or within the panels and enclosures. Nameplates shall be white lamacoid with black lettering, a minimum of 25 x 75 mm in size with up to three lines of 5 mm lettering. Securely fasten nameplates in and situate them in a visible location.

### 2.7 Panel Grounding

- .1 Provide a ground system for the instrumentation circuits, isolated from the main power system ground to each marshalling panel.
- .2 Provide grounding lugs for each panel, suitable for termination of up to #2 AWG copper grounding conductor.
- .3 Provide in each marshalling panel an isolated grounding bus bar 6 x 25 x 600 mm, equipped with necessary lugs for accepting two #2 AWG grounding conductors.
- .4 Firmly bond all panel mounted devices on or within the panels to ground. Provide supplementary bonding conductors for back panels and doors. Attach a separate bonding conductor to all devices that are not firmly fastened to the panels with screws for such devices as case mounted instruments, meters, etc.

## 3. EXECUTION

### 3.1 References - General

- .1 Refer To Section 17010 – Instrumentation and Control General Requirements, Part 3.

**END OF SECTION**



## **INSTRUMENTATION CABLE**

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### **1. GENERAL**

#### **1.1 Product Data**

- .1 Submit product data in accordance with Division 1 and Division 16.

#### **1.2 Related Work**

- .1 Refer to Division 16.

#### **1.3 Inspection**

- .1 Provide adequate notice to the Contract Administrator so that all cable installations can be inspected prior to energizing equipment.

#### **1.4 Standards**

- .1 All wire and cable shall be CSA approved.

### **2. PRODUCTS**

#### **2.1 TPSH**

- .1 TPSH shall be constructed as follows:
  - .1 Two (2) copper conductors, stranded, minimum #18 AWG, PVC insulated, twisted in nominal intervals of 50 mm.
  - .2 Insulated for 600 V, 90°C.
  - .3 100% coverage aluminum foil or tape shield.
  - .4 Separate bare stranded copper drain wire, minimum #18 AWG.
  - .5 Overall flame retardant PVC jacket to CSA-C22.2.
  - .6 The entire cable assembly to be suitable for pulling in conduit or laying in cable tray.
  - .7 Shaw Type 1751-CSA or Belden equivalent.
- .2 Where multi-conductor TPSH cables are called for, each pair shall be individually shielded, continuous number coded, and the cable assembly shall have an overall shield and overall flame retardant PVC jacket.

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**INSTRUMENTATION CABLE**

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**2.2 RTDs and Multi Conductor Shielded Cable**

- .1 RTD cables shall be CSA approved and shall be constructed as follows:
  - .1 Three (3) or more copper conductors, stranded, minimum #18 AWG
  - .2 PVC insulated for 600 V
  - .3 100% coverage aluminum foil or tape shield
  - .4 Separate bare stranded copper drain wire
  - .5 Overall flame retardant PVC jacket to CAS-C22.2

**2.3 Teck Cables**

- .1 As per Division 16

**2.4 Wire**

- .1 As per Division 16

**2.5 100 Base TX Category 5E Communication Cable**

- .1 Category 5E cable shall be CSA approved and constructed as follows:
  - .1 Four (4) bonded pairs, solid stranded, #24 AWG
  - .2 Interlocked aluminum armour
  - .3 Rip cord
  - .4 PVC inner and outer jackets
  - .5 UL verified to Category 5E
  - .6 Insulated for 300 V
  - .7 Belden 121700A or approved equal

**2.6 Fibre Optic Cables**

- .1 Provide break out style fibre optic cable assemblies where indicated in the Specification and Drawings.
- .2 Fibre optic cables shall be indoor/outdoor direct burial rated loose tube, rodent protected and constructed with specified quantity of 50/125/250  $\mu\text{m}$  multi-mode glass fibres, spiral

## **INSTRUMENTATION CABLE**

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interlocked armour, and outer polyethylene jacket. Maximum attenuation shall be 3.5/1.0 dB/km. Minimum modal bandwidth shall be 220 MHz\*km.

- .3 Provide terminations for fibre optic cables including; buffer tube fan out kits, connectors, termination/distribution panels, and wall mount enclosures, as specified in Division 17.
- .4 Provide 50/125/250 µm multi-mode duplex fibre patch cords for inter-cabinet connections.
- .5 Number of fibres are indicated on Drawings, in general fibre optic loop shall be 24 fibre, fibre optic cables to power meters and protection relays shall be 2 fibre.

### **2.7 Modbus Plus Cables**

- .1 Modbus Plus cable, aluminum armour suitable for direct burial, Belden YC39000.
- .2 Provide modbus plus terminators, drop cables, connectors as required.

## **3. EXECUTION**

### **3.1 Analog Signals**

- .1 Use TPSH cable for all low level analog signals such as 4 to 20 mA, pulse type circuits 24 VDC and under, and other signals of a similar nature.
- .2 Use RTD cable for connections between RTDs and transmitters or PLC RTD inputs.

### **3.2 Digital Signals**

- .1 Use TPSH cable for all low level (24 V and below) input and output signals.

### **3.3 Instrument Power**

- .1 Use Teck cable or wire and conduit for power to instruments, for 120 V signals other than those mentioned above and as otherwise indicated on the Drawings. Use stranded wire and cable to supply power to instruments.

### **3.4 Installation**

- .1 Install instrumentation cables in conduit systems or in cable trays. Use a minimum of 300 mm and a maximum of 1000 mm length of liquid tight flexible conduit to connect the field sensors to the conduit.
- .2 Where non-armoured instrumentation cables are installed in cable trays, provide barriers in the tray to separate instrumentation cables from power cables.
- .3 At each end of the run leave sufficient cable length for termination.

## **INSTRUMENTATION CABLE**

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- .4 Do not make splices in any of the instrumentation cable runs.
- .5 Cable shields shall be terminated on insulated terminals and carried through to the extent of the cable.
- .6 Ground cable shields at one end only. Unless otherwise specified, ground the shields at the marshalling panel.
- .7 Protect all conductors against moisture during and after installation.

### **3.5 Fibre Installation:**

- .1 Always follow the Manufacturer's guidelines for minimum bend radius and tension. Minimum bend radius shall be a minimum of 20 times the cable diameter.
- .2 When installing loose-tube cables, use a silicone injection or sealer to prevent gel migration.
- .3 All fibre installations and terminations shall be performed by personnel experienced in fibre optic cable installation.
- .4 Fibre Terminations:
  - .1 Ensure that the fibres are not damaged when the buffer tubes and fibre coatings are removed.
  - .2 After the coating is removed, clean the fibre with isopropyl alcohol to assure the fibre is clean.
  - .3 Use only high performance connectors as classified and required by TIA-568-A.
- .5 Perform cable testing with optical time domain reflectometer instrument and provide complete detailed test report. Test all runs upon completion of permanent terminations, using instrumentation acceptable to Contract Administrator. Before commencing testing, submit sample test data sheets and information with respect to test instrumentation to be used.
  - .1 Ensure that test instrument is temperature-stabilized or is temperature-independent or temperature-compensated before commencing test.
  - .2 Test for following:
    - .1 Run attenuation at 850 and 1300 wavelengths.
    - .2 Run length.
  - .3 Before recording results, compare readings to predicted values based on cable specification and run length, using connector and patch cord losses as part of predicted value. Retest runs with:
    - .1 Attenuation values greater than 6.0 dB/km @ 850 nm and 4.0 dB/km @ 1300 nm

## INSTRUMENTATION CABLE

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- .6 All fibres must pass the cable testing.

### 3.6 Cat 5E Installation:

- .1 Always follow the Manufacturer's guidelines for minimum bend radius and tension.
- .2 All installations and terminations shall be performed by personnel experienced in Cat 5E cable installation.
- .3 Perform cable testing with time domain reflectometer instrument and provide complete detailed test report. Test all runs upon completion of permanent terminations, using instrumentation acceptable to Contract Administrator. Before commencing testing, submit sample test data sheets and information with respect to test instrumentation to be used.
  - .1 Test for the following:
    - .1 Continuity.
    - .2 Pair placement and polarity.
    - .3 DC resistance.
    - .4 Characteristics at highest contemplated frequency:
      - .1 Attenuation - data cable.
      - .2 Mutual Capacitance - data cable.
      - .3 Near-end crosstalk (NEXT) - data cable.
    - .5 Run length.
  - .2 Tests to be conducted to Cat 5E standards.
  - .3 Reconnect or re-install and retest as necessary to correct excessive variations.

### 3.7 Conductor Terminations

- .1 All equipment supplied shall be equipped with terminal blocks to accept conductor connections.
- .2 Instrumentation conductors, where terminated at equipment terminals other than clamping type terminal blocks, shall be equipped with Burndy-YAE-2 or STA-KON, self-insulated, locking type terminators, sized as required to fit conductors and screw terminals.

### 3.8 Testing

- .1 Test all conductors for opens, shorts, or grounds. Resistance values shall not be less than those recommended by the cable Manufacturer.

**INSTRUMENTATION CABLE**

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**3.9 Identification**

- .1 Identify all instrumentation cables.
- .2 Identify each conductor with wire numbers using a machine printed Raychem TMS heat shrink wire marker or approved equal.

**END OF SECTION**

## POWER SUPPLIES

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### 1. GENERAL

#### 1.1 References - General

- .1 Refer to Section 17010 – Instrumentation and Control General Requirements.

### 2. PRODUCTS

#### 2.1 Power Supply and Conditioning Equipment

##### .1 General

- .1 Provide all DC power supplies as required for all instrument circuits. All circuits are to be powered from the marshalling panels. Power supplies to be Hammond, G.F.C. or approved equal, complete with an over-voltage protection module.
- .2 Provide redundant configurations for power supply equipment serving more than one instrument loop, so that failure of a single unit will not disable all or any shared part of the instrumentation and communication system. Provide diode isolation for redundant direct current supply units, and ground the negative terminal of the power supply. In accordance with Section 17110 – Enclosures, a dedicated thermal magnetic circuit breaker shall feed each power supply.
- .3 Power supplies and transmitters feeding circuits that run in non-armored cable in cable tray shall meet the requirements for Class 2 circuits as defined under Section 16 of the Canadian Electrical Code Part I.
- .4 Unless otherwise required, all DC power supplies to be rated 28 VDC, adjustable plus or minus 5%, and set to provide 26.4 V on the panel direct current bus. Size the power supply for 2 times the connected load, minimum size is 2 amps.

#### 2.2 Noise Suppression

- .1 Provide power conditioners in each panel to power AC instrumentation and control loads. Power conditioners are Oneac Series CX.

#### 2.3 UPS Power Supply

- .1 Provide two sources of 120 VAC power each control panel: UPS power for critical loads and non-UPS power for non-critical loads.
- .2 Control and operator interface system hardware including but not limited to PLC'S, PLC I/O racks, PLC communication modules, HMI computers and industrial network switches shall be powered from the UPS.
- .3 Instrument power and associated DC power supplies shall be powered from the UPS.

## **POWER SUPPLIES**

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- .4 Non-critical loads include control panel interior lights and receptacles.
- .5 Online double conversion UPS' shall be provided in each electrical and server room as specified in Division 16. Coordinate with Division 16 to ensure that the Bulk Chemical and Sodium Hypochlorite facility UPS'S are of sufficient size to power the critical loads that are fed from each control panel.
- .6 Mount a lamacoid on the control panel stating that the panel has more than one power source.

### **3. EXECUTION**

#### **3.1 References - General**

- .1 Refer to Section 17010 – Instrumentation and Control General Requirements, Part 3.

**END OF SECTION**



**PROCESS TAPS AND PRIMARY ELEMENTS**

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**1. GENERAL**

**1.1 References - General**

- .1 Equipment, products, and execution must meet all requirements detailed in Section 17010 – Instrumentation and Control General Requirements.

**2. PRODUCTS**

**2.1 Process Taps**

- .1 Supply pressure gauge and thermowell taps. Products shall be as specified in Division 15.

**2.2 Primary Elements**

- .1 Supply and install primary elements and transmitters as specified on the Instrumentation Specification Sheets of Section 17701 – Instrumentation Specification Sheets.
- .2 Supply written assurance that the instrument Manufacturer approves the selection for the primary element materials that are in contact with the specified process fluid and certifies that the materials are inert to the effects of the process fluid.
- .3 Supply and Install drip pots for sensing elements measuring gas. Supply seamless, stainless steel drip pots consisting of a 50 x 300 mm pipe with an isolating valve and a drain valve. Install a separate drip pot on each sensing line. Locate the drain valve within 500 mm of the floor.
- .4 Supply diaphragm seals for any fluid other than water or glycol.
- .5 When diaphragm seals are specified with a pressure gauge or a pressure switch provide the assembly filled with ethylene glycol and calibrated by the Manufacturer.
- .6 Supply and install an ethylene glycol filled assembly calibrated by the manufacturer when in-line pressure sensors are specified with a pressure gauge or a pressure switch or in combination.

**3. EXECUTION (NOT USED)**

**END OF SECTION**

## **TRANSMITTERS AND INDICATORS**

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### **1. GENERAL**

#### **1.1 References - General**

- .1 Equipment, products and execution must meet all requirements detailed in Section 17010 – Instrumentation and Control General Requirements.

### **2. PRODUCTS**

#### **2.1 Transmitters and Indicators**

- .1 Supply and install transmitters and indicators as specified on the Instrument Specification Sheets of Section 17701 – Instrument Specification Sheets.
- .2 Transmitters shall have adequate power output to drive all devices associated with the signal loop. Provide signal boosters as required to achieve adequate signal strength or to isolate the signal. Provide current-to-current signal isolators for all secondary devices in the control loop.
- .3 All transmitters to have local indication scaled in engineering units as specified in the Specifications. Provide a lamicoid label indicating the calibrated range and engineering units and mount adjacent to the transmitter. Mount the transmitter so the indicator is visible by operations personnel.
- .4 Remote indicators provided by Crompton Instruments, Simpson, or Newport are acceptable for use.
- .5 Where the loop specification calls for a transmitter and an indicator to be mounted in the same panel, an indicating transmitter may be considered acceptable, provided the indicator is normally visible from outside the enclosure.
- .6 Where available as an option, the transmitter shall be supplied with an isolated fault contact.
- .7 Standard of acceptance for instrumentation shall be as follows:
  - .1 Pressure Transmitters: Rosemount Model 3051, ABB or Foxboro complete with stainless steel two (2) and three (3) valve manifolds as manufactured by Anderson Greenwood.
  - .2 Pressure Gauges: Ashcroft, H.O. Terrice, Budenberg.
  - .3 Ultrasonic Level Transmitters: Siemens Multiranger 100/200, Magnetrol, Endress & Hauser.
  - .4 Temperature Transmitters (RTD): Rosemount, ABB, Foxboro.

**TRANSMITTERS AND INDICATORS**

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.5 Gas Detection Systems: Draeger, MSA, Crowcon.

**3. EXECUTION**

**3.1 References - General**

.1 Refer to Section 17010 – Instrumentation and Control General Requirements.

**END OF SECTION**

## SWITCHES AND RELAYS

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### 1. GENERAL

#### 1.1 References - General

- .1 Refer to Section 17010 – Instrumentation and Control General Requirements.

### 2. PRODUCTS

#### 2.1 General

- .1 Use normally closed contacts for alarm actuation. The contacts open to initiate the alarm.
- .2 Use normally open contacts to control equipment. The contacts close to start the equipment.
- .3 Contacts monitored by solid state equipment to be hermetically sealed and adequately rated for the connected load.
- .4 Contacts monitored by electro-magnetic devices such as mechanical relays to be rated NEMA ICS 2, designation B300.
- .5 Provide double barriers between switch elements and process fluids such that failure of one (1) barrier will not permit process fluids into electrical enclosures.
- .6 Switch electrical enclosures to be rated EEMAC 4X, minimum.
- .7 120 VAC switches to have a 4A rating.

#### 2.2 Indicators, Pushbuttons, and Selector Switches

- .1 All control indicator lamps, pushbutton switches and selector switches in unclassified or non-corrosive areas to be Allen Bradley 800T or 800E series items or Cutler Hammer 10250T series.
- .2 All control indicator lamps, pushbutton switches, and selector switches in classified or corrosive (includes outdoors) areas to be Allen Bradley 800H series items or Cutler Hammer E34 series.
- .3 Enclosures to be specified under Section 17110 – Enclosures.
- .4 All control indicator lamps shall be push-to-test type.

#### 2.3 Relays

- .1 The quality and type of relays shall be based on Omron relays. Other acceptable manufacturers are Idec and Potter & Brumfield.

## **SWITCHES AND RELAYS**

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- .2 120 VAC relays to be Model LY 4PDT, plug-in, complete with test button and operation indicator, and surge suppressor.
- .3 24 VDC relays to be Model MY 2PDT plug-in, complete with test button and operation indicator, and surge suppressor diode.
- .4 Time delay relays for behind panel mounting to be Omron Model H3BA, 2PDT, plug-in, and programmable for sixteen (16) time ranges and four (4) operation modes.
- .5 Time delay relays for flush panel mounting and operator accessible timing range modifications to be Omron Model H5BR, SPDT, screw terminals, programmable for five (5) timing ranges and eight (8) operation modes, complete with digital display, module for time settings and flexible protective cover.
- .6 Where the contact ratings of the relays listed are insufficient for the application, select an appropriate type from an approved Manufacturer with the same quantity of contacts as was originally specified.
- .7 Provide relay plug-in sockets for DIN mounting complete with stacked screw clamp terminals.

### **2.4 Process Switches**

- .1 Standard of acceptance for instrumentation shall be as follows:
  - .1 Thermal Flow Switches: Ifm, Weber.
  - .2 Pressure Switches (Electronic): Ifm, United Electric.
  - .3 Pressure Switches (Conventional): Ashcroft, United Electric, Barksdale.
  - .4 Conductivity Level Switches: Endress & Hauser.
  - .5 Float Switches: Flygt, Consolidated Electric, Warwick, Magnetrol.
  - .6 Temperature Switches: Ifm.

## **3. EXECUTION**

### **3.1 References – General**

- .1 Refer to Section 17010 – Instrumentation and Control General Requirements.

**END OF SECTION**

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**MISCELLANEOUS PANEL DEVICES**

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**1. GENERAL**

**1.1 References - General**

- .1 Equipment, products, and execution must meet all requirements detailed in Section 17010 – Instrumentation and Control General Requirements.

**2. PRODUCTS**

**2.1 Miscellaneous Panel Devices**

.1 Pilot Lights

- .1 Supply and install LED or transformer type pilot lights for extended lamp life, oil tight, push to test, complete with appropriate colour lenses. Normal colours used are run = red, stop = green.

.2 Terminals

- .1 Supply and install strap screw type terminal blocks rated for 600 V.
- .2 Identify each terminal block within an enclosure with a unique machine printed terminal block number. Cabinet chassis grounding terminal blocks are to be identified by the electrical ground symbol.
- .3 Connections to screw terminals to be locking fork tongue insulated crimp type wire connectors.
- .4 Terminals to be Weidmuller or approved equal.
- .5 Supply and install a group of terminals for each of 120 VAC non-UPS hot and neutral, 120 VAC UPS hot and neutral and 24 VDC positive and negative power. Distribution wiring to have a thermal magnetic circuit breaker upstream of all major blocks of loads, adequately sized to protect the connected load while not causing nuisance tripping.
- .6 Supply and install Weidmuller disconnect type terminal blocks for each load or loop powered from the marshalling panels.

.3 Nameplates

- .1 Refer to Section 17010 – Instrumentation and Control General Requirements for nameplate Specification.

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**MISCELLANEOUS PANEL DEVICES**

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**2.2 Signal Current Isolator**

- .1 Isolators shall be installed to provide galvanic isolation of milli-ampere transmission signals from transmitters with inadequately isolated output circuits.
- .2 Isolator shall be housed in a NEMA 250, Type 4/7 conduit body and derive its operating power from the signal input circuit.
- .3 Input and output signals shall be 4 to 20 mA, with an error not exceeding 0.1% of span. Input resistance will not exceed 550 ohms with an output load of 250 ohms.
- .4 Approved manufacturers are Moore Industries, Weidmuller or Phoenix.

**2.3 Intrinsic Safety Barriers and Relays**

- .1 Provide intrinsic safety barriers where required for two-wire transmitters of the active, isolating, loop powered type; MTL Type MT3042, Stahl 9005/01-252/100/00, Pepperl & Fuchs ZG series, or approved equal.
- .2 Provide dual type intrinsic safety barriers for process switches; MTL 787, Panalarm 201-BR2.
- .3 Intrinsic safety relays to be Gems or Warrick.

**2.4 Industrial Ethernet Switches**

- .1 Install rack mounted Ethernet Switches in separate network cabling termination cabinet mounted next to all control panels housing PLCs that interface to the WTP control and operator interface network as shown on the drawings. Connect to the PLCs, local HMIs, VFDs, power meters and motor protection relays as shown on the drawings using cable rated for 100 Base-TX, 10 BaseFL, or 100 BaseFX communication, as required by the device.
- .2 Switches shall comply with IEEE 802.3, 802.3u, 802.3x, 802.1D, IEC 61950-3.
- .3 Switched shall be connected in a ring topology utilizing a 1000SX Multimode backbone.
- .4 Provide switches as required to connect to the equipment indicated in the Drawings and the following minimum spare ports:
  - .1 4 - 10/100 Base T(x) RJ45 ports
  - .2 2 - 10 BaseFL multimode ports
  - .3 2 - 100 BaseFX multimode ports
- .5 Provide as a minimum two (2) switches in each cabinet for the PLC and HMI fibre networks.
- .6 Switches shall include one (1) relay output alarm contact rated for 1A@24 VDC.

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**MISCELLANEOUS PANEL DEVICES**

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- .7 Input power shall be 120 VAC.
- .8 Switches shall be fast spanning for a sub-second recovery in a ring configuration.
- .9 Switches shall be Ruggedcom RSG2100 or approved equal.

**2.5 Fibre Termination Panel**

- .1 Fibre termination panel suitable for the termination of two (2) 24-strand multimode fibre optic cables. Multiple 2-strand multimode fibre cables for connection to power meters and protection relays shall be terminated to same panel.
- .2 Termination panel shall be rack mounted, hinged front and rear doors, complete with grounding kit and cable strain relief.
- .3 Install in network cabling termination cabinet
- .4 Leviton DP-525 or approved equal.

**2.6 Cat 5E Termination Panel**

- .1 Rack mounted termination panel suitable for the termination of 24 Cat 5E cables.
- .2 Install in network cabling termination cabinet.

**3. EXECUTION**

**3.1 References - General**

- .1 Refer To Section 17010 – Instrumentation and Control General Requirements, Part 3.

**END OF SECTION**



## **GAS DETECTION SYSTEMS**

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### **1. GENERAL**

#### **1.1 Description**

- .1 This Section specifies the supply, installation, testing and Performance Verification of gas detection systems.
- .2 Use this Specification in conjunction with Section 17010 – Instrumentation and Control General Requirements.

#### **1.2 Reference Standards**

- .1 Conform to the following reference standards in accordance with Division 1:
  - .1 CSA C22.2 No. 152, Combustible Gas Detection Instruments.
  - .2 CSA - C22.1 Canadian Electrical Code

#### **1.3 Shipping and Storage**

- .1 Ship and store equipment in accordance with the requirements of Division 1.
- .2 Store gas detection instruments in their original shipping containers in a dry location that is free of fumes and vapours. Never store an instrument in an area where desensitizing agents (such as paint or silicone) may be present.

### **2. PRODUCTS**

#### **2.1 Function**

- .1 General
  - .1 Refer to Section 17010 – Instrumentation and Control General Requirements, Part 2.
  - .2 Provide gas detection systems which include where shown on drawings:
    - .1 Field mounted sensors/transmitters.
    - .2 Alarm beacons.
    - .3 Room entrance alarm panels.
  - .3 Provide field elements that are certified Class I, Division I.

## **GAS DETECTION SYSTEMS**

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### **2.2 Details**

- .1 The gas detection system will monitor for concentrations of Ammonia.
- .2 Provide sensors and calibrators as specified on the Instrumentation Specification Sheets in Section 17701 – Instrument Specification Sheets.
- .3 Alarm beacons will operate on 120 V, 60 Hz. Beacons mounted in the process area will be classified Class I, Division I. Beacons mounted outdoors will be EEMAC 4X.
- .4 Power gas monitors from separate breakers located in a UPS powered panel board in the electrical room or the local control panel.
- .5 Refer to the requirements of Section 17010 – Instrumentation and Control General Requirements for instrument and wiring identification.

### **2.3 Spare Parts/Tools**

- .1 Provide a calibration kit including a one year supply of all gases to calibrate all sensors and sensor types. The calibration kit must include, but not be limited to, all regulators and equipment required to perform regular on-site calibrations.

## **3. EXECUTION**

### **3.1 General**

- .1 Refer to the requirements of Section 17010 – Instrumentation and Control General Requirements, Part 3 for additional execution details.

### **3.2 Wiring**

- .1 Wire devices as shown on the installation details and the cabling diagrams.
- .2 Wiring methods must comply with the area classification, CSA C22.2 No. 152 and the requirements of Division 16.

### **3.3 Field Testing and Inspection**

- .1 Refer to the requirements of Section 17010 – Instrumentation and Control General Requirements, Part 3 for additional details.
- .2 Provide an inspection of the gas detection system and all related components. The inspection will comprise of the following:
  - .1 That the system functions as intended including equipment shutdowns and start-ups, alarms, reset, calibration, etc.

## **GAS DETECTION SYSTEMS**

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- .2 That all CSA requirements were adhered to when making wiring connections to all equipment components.
- .3 That equipment has been installed in accordance with Manufacturer's recommendations and that all signal devices have been operated or tested to verify their operation.

### **3.4 Performance Verification & Start-up**

- .1 Performance Verification and start-up will be performed in accordance with CSA Standard C22.2 No. 152 and the requirements of Section 17010 – Instrumentation and Control General Requirements, Part 3.

### **3.5 Certification**

- .1 Inspection certification: on completion of the inspection and when all of the above conditions have been complied with, the Contract Administrator will be issued:
  - .1 A copy of the inspecting technician's report showing location of each device and certifying the test results of each device.
  - .2 A certificate of verification confirming that the inspection has been completed and showing the conditions upon which such inspection and certification have been rendered.

### **3.6 Training**

- .1 Provide on Site training in accordance with Division 1 and Section 17010 – Instrumentation and Control General Requirements.

**END OF SECTION**

## **PROGRAMMABLE LOGIC CONTROLLERS**

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### **1. GENERAL**

#### **1.1 References - General**

- .1 Equipment, products, and execution must meet all requirements detailed in Section 17010 – Instrumentation and Control General Requirements.

#### **1.2 Work Included**

- .1 Supply and installation of a PLC-based control system that will control and monitor the system in accordance with the requirements specified on the drawings and the I/O lists.
- .2 PLC's and I/O shall be housed in central control panels.
- .3 PLC programming is not in the scope of this Contract.
- .4 Provide Start-up and commissioning assistance to Supply Contractors and the Commissioning Agent as required for the control system.

### **2. PRODUCTS**

#### **2.1 PLCs**

- .1 General
  - .1 All new PLC equipment shall be based on the Modicon Unity Processor family.
  - .2 All PLC's shall be Modicon Unity hot standby processors complete with standby processors.
  - .3 Communication protocol for the new PLC network shall be Modbus/TCP. Ethernet communication modules shall be provided in each PLC rack to interface to the WTP control network.
  - .4 Supply and Install all necessary racks, power supplies, cables, I/O cards, communication cards, and accessories.
  - .5 Supply 10% spare slot capacity for each PLC panel assembly.
  - .6 Supply 25% spare power supply capacity for each PLC panel assembly.
  - .7 PLC racks shall be powered from the external UPS system. Each new PLC panel assembly shall include Sola Hevi-Duty STV100K series incoming power transient surge suppression or approved equal. Connect the surge suppressor dry contact to a PLC input and configure as an alarm on the control system at each panel.

**PROGRAMMABLE LOGIC CONTROLLERS**

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- .2 PLC
  - .1 Modicon Unity main processor and hot standby CPU: Model Number 140 CPU 671 60.
  - .2 Modicon NOE (Modbus/TCP) modules for each processor rack.
  - .3 Redundant cable remote I/O modules in each I/O rack: Model Numbers 140 CRP 932 00 and 140 CRA 932 00.
  - .4 I/O modules to meet the specifications specified in Subsection 2.1.1 and the I/O requirements of the P&IDs, instrument loop diagrams and I/O Lists.
- .3 I/O
  - .1 120 VAC Digital Inputs: Model Number 140 DAI 540 00.
  - .2 24 VDC Digital Inputs: Model Number 140 DDI 353 00.
  - .3 Digital Outputs: Model Number 140 DRA 840 00.
  - .4 Analog Inputs: Model Number 140 ACI 030 00.
  - .5 Analog Outputs: Model Number 140 ACO 020 00.
  - .6 Provide at least 20% spare I/O of each type in each panel assembly.
- .4 Remote I/O Fibre Optic Repeaters
  - .1 Modicon 490 NRP 954.
  - .2 Repeaters shall be installed in network cabling termination cabinet as indicated on Drawings.

**2.2 System Integration Requirements**

- .1 Cooperate with other Contractors, the City and the Contract Administrator to facilitate installation, testing, validation, and Commissioning of the control system.
- .2 Supply, install, test, and verify performance of the PLC Control Panel as specified in this Section and as shown on the Drawings.
- .3 Assist the Systems Integrator to establish communication with the PLCs. Test data exchange with the PLC as specified in this Section and the process descriptions.

**PROGRAMMABLE LOGIC CONTROLLERS**

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**3. EXECUTION**

**3.1 References – General**

- .1 Refer to Section 17010 – Instrumentation and Control General Requirements, Part 3.

**END OF SECTION**

## **OPERATOR INTERFACE REQUIREMENTS**

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### **1. GENERAL**

#### **1.1 References – General**

- .1 Equipment, products, and execution must meet all requirements detailed in Section 17010 – Instrumentation and Control General Requirements.

#### **1.2 General Requirements**

- .1 For the purpose of this Contract, the tag name convention used on the I/O lists included with the Specifications and shown on the P&IDs will be used. Coordinate the implementation of tags for any instrumentation not listed with the Contract Administrator.

### **2. PRODUCTS**

#### **.1 Local Control and Operator Interface:**

- .1 Provide all necessary local controls to allow local operation that compliments the operation of the WTP control system and facilitates satisfactory system control consistent with the intent of this Specification.

#### **.2 Interface to the WTP Control System:**

- .1 This Contractor is to support the design, installation, programming, and start-up of the WTP control system as follows:
  - .1 Supply all field instrumentation necessary to facilitate both local and remote monitoring and control of the system.
  - .2 Provide all hardware interfaces required to facilitate the interconnection of the contractor supplied PLCs to the WTP control system.
  - .3 Supply and install all cables, jumper wires and termination panels as shown on the Drawings and as necessary to facilitate connection of local HMIs to the WTP monitoring system and to create a complete and comprehensive WTP control and monitoring system.
  - .4 Update all system documentation prior to Total Performance to reflect the final installation.

### **3. EXECUTION**

#### **3.1 Performance – General**

- .1 Refer to Section 17010 – Instrumentation and Control General Requirements, Part 3.

**OPERATOR INTERFACE REQUIREMENTS**

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**3.2 Installation**

- .1 Provide hardware in accordance with the foregoing requirements in sufficient quantity to satisfy the performance requirements specified in this and other Divisions of this Specification.
- .2 Provide all necessary documentation to complete the configuration of the control system including I/O lists, alarm lists, critical process variables, instrumentation lists, loop wiring requirements for I/O and local control equipment details.
- .3 Provide Performance Verification and assist with Commissioning.
- .4 Provide all documentation and training as defined in the Specifications.

**END OF SECTION**



**PLC I/O INDEX**

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**1. GENERAL**

**1.1 References - General**

.1 Refer to Section 17010 – Instrumentation and Control General Requirements.

**1.2 Programmable Logic Controller Input/Output Index**

.1 The following spreadsheet gives an itemized list of the I/O between the PLC and the field devices. It is intended to serve as an aid for determining the cabling requirements for the Work specified in this Division.

**2. PRODUCTS (NOT USED)**

**3. EXECUTION (NOT USED)**

**END OF SECTION**

**PLC I/O INDEX**

RECORD NO.	REV. NO.	TAG NAME	DESCRIPTION		P&ID DRAWING	I/O SPECIFICATION								
			FUNCTION	SERVICE		ENG. UNITS	SCALE		ALARMS		PLC CABINET	I/O TYPE	I/O ADDRESS	
							LOW	HIGH	LOW	HIGH				
0001	0	AI-J001B	Water Hardness Indication	Softened Water Hardness Monitor	CPG0465-I-01 Sheet 3							CP-J11	AI	
0002	0	FI-J001A	Flow Indication	Softened Water Flow to Salt Saturators and Electrolysers Flow Rate	CPG0465-I-01 Sheet 3							CP-J11	AI	
0003	0	FQ-J001A	Flow Pulse	Softened Water Flow to Salt Saturators and Electrolysers Flow Total	CPG0465-I-01 Sheet 3							CP-J11	DI	
0004	0	UF-J001B	Water Hardness Fault	Softened Water Hardness Monitor	CPG0465-I-01 Sheet 3							CP-J11	DI	
0005	0	TI-J003A	Temperature Indication	Softened Water to Electrolysers Temperature	CPG0465-I-01 Sheet 3							CP-J11	AI	
0006	0	LA-J100A	Level Switch	Salt Saturator SS-J100A Brine High Level	CPG0465-I-01 Sheet 3							CP-J11	DI	
0007	0	LF-J100A	Level Fault	Salt Saturator SS-J100A Brine Level Fault	CPG0465-I-01 Sheet 3							CP-J11	DI	
0008	0	LI-J100A	Level Indication	Salt Saturator SS-J100A Brine Level	CPG0465-I-01 Sheet 3							CP-J11	AI	
0009	0	LF-J100B	Level Fault	Salt Saturator SS-J100A Salt Level Fault	CPG0465-I-01 Sheet 3							CP-J11	DI	
0010	0	LI-J100B	Level Indication	Salt Saturator SS-J100A Salt Level	CPG0465-I-01 Sheet 3							CP-J11	AI	
0011	0	TI-J100A	Temperature Indication	Salt Saturator SS-J100A Temperature	CPG0465-I-01 Sheet 3							CP-J11	AI	
0012	0	YD-J100A	Open Command	Softened Water Flow Control Valve to Salt Saturator SS-J100A Valve Open	CPG0465-I-01 Sheet 3							CP-J11	DI	
0013	0	LA-J200A	Level Alarm	Salt Saturator SS-J200A Brine High Level	CPG0465-I-01 Sheet 3							CP-J11	DI	
0014	0	LF-J200A	Level Fault	Salt Saturator SS-J200A Brine Level Fault	CPG0465-I-01 Sheet 3							CP-J11	DI	
0015	0	LI-J200A	Level Indication	Salt Saturator SS-J200A Brine Level	CPG0465-I-01 Sheet 3							CP-J11	AI	
0016	0	LF-J200B	Level Fault	Salt Saturator SS-J200A Salt Level Falt	CPG0465-I-01 Sheet 3							CP-J11	DI	
0017	0	LI-J200B	Level Indication	Salt Saturator SS-J200A Salt Level	CPG0465-I-01 Sheet 3							CP-J11	AI	
0018	0	TI-J200A	Temperature Indication	Salt Saturator SS-J200A Temperature	CPG0465-I-01 Sheet 3							CP-J11	AI	
0019	0	YD-J200A	Open Command	Softened Water Flow Control Valve to Salt Saturator SS-J200A Valve Open	CPG0465-I-01 Sheet 3							CP-J11	DI	

I/O POINT TYPES: TCP = Modbus/TCP Ethernet, AI = Analog Input, AO = Analog Output, DI = Discrete Input, DO = Discrete Output

**PLC I/O INDEX**

RECORD NO.	REV. NO.	TAG NAME	DESCRIPTION		P&ID DRAWING	I/O SPECIFICATION								
			FUNCTION	SERVICE		ENG. UNITS	SCALE		ALARMS		PLC CABINET	I/O TYPE	I/O ADDRESS	
							LOW	HIGH	LOW	HIGH				
0020	0	EI-J400A	Voltage Indication	Electrolyser Rectifier Voltage	CPG0465-I-01 Sheet 4							CP-J11	AI	
0021	0	FA-J400A	Flow Alarm	Softened Water Low Flow to Electrolyser EL-J400A	CPG0465-I-01 Sheet 4							CP-J11	DI	
0022	0	FA-J400B	Flow Switch	Softened Water Low Flow to Electrolyser EL-J400A	CPG0465-I-01 Sheet 4							CP-J11	DI	
0023	0	FA-J400C	Flow Switch	Low Brine Flow to Electrolyser EL-J400A	CPG0465-I-01 Sheet 4							CP-J11	DI	
0024	0	FA-J400D	Flow Switch	Low Brine/ Softened Water Flow to Electrolyser EL-J400A	CPG0465-I-01 Sheet 4							CP-J11	DI	
0025	0	FA-J400E	Flow Alarm	Electrolyser EL-J400A Ventilation Low Flow	CPG0465-I-01 Sheet 4							CP-J11	DI	
0026	0	IC-J400A	Current Control	Electrolyser Rectifier Current Control	CPG0465-I-01 Sheet 4							CP-J11	AO	
0027	0	II-J400A	Current Indication	Electrolyser Rectifier Current	CPG0465-I-01 Sheet 4							CP-J11	AI	
0028	0	LA-J400A	Level Switch	Electrolyser EL-J400A High Cell Level	CPG0465-I-01 Sheet 4							CP-J11	DI	
0029	0	LA-J400B	Level Switch	Electrolyser EL-J400A Low Cell Level	CPG0465-I-01 Sheet 4							CP-J11	DI	
0030	0	MM-J400A	Running Status	Electrolyse Rectifier RT-J400 Running	CPG0465-I-01 Sheet 4							CP-J11	DI	
0031	0	PA-J400A	Pressure Switch	Electrolyser EL-J400A Cell Pressure High	CPG0465-I-01 Sheet 4							CP-J11	DI	
0032	0	PA-J400B	Pressure Switch	Electrolyser EL-J400A Cell Pressure High	CPG0465-I-01 Sheet 4							CP-J11	DI	
0033	0	PA-J400C	Pressure Switch	Electrolyser EL-J400A Cell Pressure High	CPG0465-I-01 Sheet 4							CP-J11	DI	
0034	0	TA-J400A	Temperature Alarm	Electrolyser Rectifier RT-J400 High Temperature	CPG0465-I-01 Sheet 4							CP-J11	DI	
0035	0	UF-J400A	No Fault	Electrolyser Rectifier Fault	CPG0465-I-01 Sheet 4							CP-J11	DI	
0036	0	UF-J400B	No Fault	Electrolyser Rectifier Fan Fault	CPG0465-I-01 Sheet 4							CP-J11	DI	
0037	0	YD-J400A	Open Command	Electrolyser EL-J400A Ventilation Blower BLR-J400A in Open Mode	CPG0465-I-01 Sheet 4							CP-J11	DI	
0038	0	EI-J420A	Voltage Indication	Electrolyser Rectifier Voltage	CPG0465-I-01 Sheet 4							CP-J11	AI	

I/O POINT TYPES: TCP = Modbus/TCP Ethernet, AI = Analog Input, AO = Analog Output, DI = Discrete Input, DO = Discrete Output

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RECORD NO.	REV. NO.	TAG NAME	DESCRIPTION		P&ID DRAWING	I/O SPECIFICATION								
			FUNCTION	SERVICE		ENG. UNITS	SCALE		ALARMS		PLC CABINET	I/O TYPE	I/O ADDRESS	
							LOW	HIGH	LOW	HIGH				
0039	0	FA-J420A	Flow Alarm	Softened Water Low Flow to Electrolyser EL-J420A	CPG0465-I-01 Sheet 4							CP-J11	DI	
0040	0	FA-J420B	Flow Alarm	Softened Water Low Flow to Electrolyser EL-J420A	CPG0465-I-01 Sheet 4							CP-J11	DI	
0041	0	FA-J420C	Flow Alarm	Low Brine Flow to Electrolyser EL-J420A	CPG0465-I-01 Sheet 4							CP-J11	DI	
0042	0	FA-J420D	Flow Alarm	Low Brine/ Softened Water Flow to Electrolyser EL-J420A	CPG0465-I-01 Sheet 4							CP-J11	DI	
0043	0	IC-J420A	Current Control	Electrolyser Rectifier Current Control	CPG0465-I-01 Sheet 4							CP-J11	AO	
0044	0	II-J420A	Current Indication	Electrolyser Rectifier Current	CPG0465-I-01 Sheet 4							CP-J11	AI	
0045	0	LA-J420A	Level Alarm	Electrolyser EL-J420A High Cell Level	CPG0465-I-01 Sheet 4							CP-J11	DI	
0046	0	LA-J420B	Level Alarm	Electrolyser EL-J420A Low Cell Level	CPG0465-I-01 Sheet 4							CP-J11	DI	
0047	0	MM-J420A	Running Status	Electrolyser Rectifier RT-J400 Running	CPG0465-I-01 Sheet 4							CP-J11	DI	
0048	0	PA-J420A	Pressure Alarm	Electrolyser EL-J420A Cell Pressure High	CPG0465-I-01 Sheet 4							CP-J11	DI	
0049	0	PA-J420B	Pressure Alarm	Electrolyser EL-J420A Cell Pressure High	CPG0465-I-01 Sheet 4							CP-J11	DI	
0050	0	PA-J420C	Pressure Alarm	Electrolyser EL-J420A Cell Pressure High	CPG0465-I-01 Sheet 4							CP-J11	DI	
0051	0	TA-J420A	Temperature Alarm	Electrolyser Rectifier RT-J420A High Temperature	CPG0465-I-01 Sheet 4							CP-J11	DI	
0052	0	UF-J420A	No Fault	Electrolyser Rectifier Fault	CPG0465-I-01 Sheet 4							CP-J11	DI	
0053	0	UF-J420B	No Fault	Electrolyser Rectifier Fan Fault	CPG0465-I-01 Sheet 4							CP-J11	DI	
0054	0	YD-J420A	Open Command	Electrolyser EL-J420A Ventilation Blower BLR-J420A in Open Mode	CPG0465-I-01 Sheet 4							CP-J11	DI	
0055	0	EI-J440A	Voltage Indication	Electrolyser Rectifier Voltage	CPG0465-I-01 Sheet 4							CP-J11	AI	
0056	0	FA-J440A	Flow Alarm	Softened Water Low Flow to Electrolyser EL-J440A	CPG0465-I-01 Sheet 4							CP-J11	DI	
0057	0	FA-J440B	Flow Alarm	Softened Water Low Flow to Electrolyser EL-J440A	CPG0465-I-01 Sheet 4							CP-J11	DI	

I/O POINT TYPES: TCP = Modbus/TCP Ethernet, AI = Analog Input, AO = Analog Output, DI = Discrete Input, DO = Discrete Output

**PLC I/O INDEX**

RECORD NO.	REV. NO.	TAG NAME	DESCRIPTION		P&ID DRAWING	I/O SPECIFICATION								
			FUNCTION	SERVICE		ENG. UNITS	SCALE		ALARMS		PLC CABINET	I/O TYPE	I/O ADDRESS	
							LOW	HIGH	LOW	HIGH				
0058	0	FA-J440C	Flow Alarm	Low Brine Flow to Electrolyser EL-J440A	CPG0465-I-01 Sheet 4							CP-J11	DI	
0059	0	FA-J440D	Flow Alarm	Low Brine/ Softened Water Flow to Electrolyser EL-J440A	CPG0465-I-01 Sheet 4							CP-J11	DI	
0060	0	IC-J440A	Current Control	Electrolyser Rectifier Current Control	CPG0465-I-01 Sheet 4							CP-J11	AO	
0061	0	II-J440A	Current Indication	Electrolyser Rectifier Current	CPG0465-I-01 Sheet 4							CP-J11	AI	
0062	0	LA-J440A	Level Alarm	Electrolyser EL-J440A High Cell Level	CPG0465-I-01 Sheet 4							CP-J11	DI	
0063	0	LA-J440B	Level Alarm	Electrolyser EL-J440A Low Cell Level	CPG0465-I-01 Sheet 4							CP-J11	DI	
0064	0	MM-J440A	Running Status	Electrolyser Rectifier RT-J400 Running	CPG0465-I-01 Sheet 4							CP-J11	DI	
0065	0	PA-J440A	Pressure Alarm	Electrolyser EL-J440A Cell Pressure High	CPG0465-I-01 Sheet 4							CP-J11	DI	
0066	0	PA-J440B	Pressure Alarm	Electrolyser EL-J440A Cell Pressure High	CPG0465-I-01 Sheet 4							CP-J11	DI	
0067	0	PA-J440C	Pressure Alarm	Electrolyser EL-J440A Cell Pressure High	CPG0465-I-01 Sheet 4							CP-J11	DI	
0068	0	TA-J440A	Temperature Alarm	Electrolyser Rectifier RT-J440A High Temperature	CPG0465-I-01 Sheet 4							CP-J11	DI	
0069	0	UF-J440A	No Fault	Electrolyser Rectifier Fault	CPG0465-I-01 Sheet 4							CP-J11	DI	
0070	0	UF-J440B	No Fault	Electrolyser Rectifier Fan Fault	CPG0465-I-01 Sheet 4							CP-J11	AI	
0071	0	YD-J440A	Open Command	Electrolyser EL-J440A Ventilation Blower BLR-J440A in Open Mode	CPG0465-I-01 Sheet 4							CP-J11	DI	
0072	0	AI-J450A	Hydrogen Gas Indication	Electrolyser Room Hydrogen Gas Level	CPG0465-I-01 Sheet 4							CP-J11	AI	
0073	0	GI-J450A	Gas Indicator	Sodium Hypochlorite Storage Room Hydrogen Gas Level	CPG0465-I-01 Sheet 4							CP-J11		
0074	0	GI-J450B	Gas Indicator	Sodium Hypochlorite Storage Room Hydrogen Gas Level	CPG0465-I-01 Sheet 4							CP-J11		
0075	0	FA-J500A	Flow Alarm	Sodium Hypochlorite Storage Tank TK-J500A Ventilation Flow Low	CPG0465-I-01 Sheet 5							CP-J11	DI	
0076	0	LF-J500A	Level Fault	Sodium Hypochlorite Storage Tank TK-J500A Level Fault	CPG0465-I-01 Sheet 5							CP-J11	DI	

I/O POINT TYPES: TCP = Modbus/TCP Ethernet, AI = Analog Input, AO = Analog Output, DI = Discrete Input, DO = Discrete Output

**PLC I/O INDEX**

RECORD NO.	REV. NO.	TAG NAME	DESCRIPTION		P&ID DRAWING	I/O SPECIFICATION								
			FUNCTION	SERVICE		ENG. UNITS	SCALE		ALARMS		PLC CABINET	I/O TYPE	I/O ADDRESS	
							LOW	HIGH	LOW	HIGH				
0077	0	LI-J500A	Level Indication	Sodium Hypochlorite Storage Tank TK-J500A Level	CPG0465-I-01 Sheet 5							CP-J11	AI	
0078	0	MM-J500A	Running Status	Sodium Hypochlorite Storage Tank TK-J500A Ventilation Blower Running	CPG0465-I-01 Sheet 5							CP-J11	DI	
0079	0	MN-J500A	Start Command	Sodium Hypochlorite Storage Tank TK-J500A Ventilation Blower Start	CPG0465-I-01 Sheet 5							CP-J11	DO	
0080	0	MM-J500B	Running Status	Sodium Hypochlorite Storage Tank TK-J500A Ventilation Blower Running	CPG0465-I-01 Sheet 5							CP-J11	DI	
0081	0	MN-J500B	Start Command	Sodium Hypochlorite Storage Tank TK-J500A Ventilation Blower Start	CPG0465-I-01 Sheet 5							CP-J11	DO	
0082	0	PA-J500A	Pressure Alarm	Sodium Hypochlorite Storage Tank TK-J500A Ventilation Pressure High	CPG0465-I-01 Sheet 5							CP-J11	DI	
0083	0	YS-J500A	C/O/H Alarm in Computer Position	Sodium Hypochlorite Storage Tank TK-J500A Ventilation Blower in Computer Mode	CPG0465-I-01 Sheet 5							CP-J11	DI	
0084	0	YS-J500B	C/O/H Alarm in Computer Position	Sodium Hypochlorite Storage Tank TK-J500A Ventilation Blower in Computer Mode	CPG0465-I-01 Sheet 5							CP-J11	DI	
0085	0	GI-J500A	Gas Indicator	Sodium Hypochlorite Storage Room Hydrogen Gas Level	CPG0465-I-01 Sheet 5							CP-J11	AI	
0086	0	FA-J520A	Flow Alarm	Sodium Hypochlorite Storage Tank TK-J520A Ventilation Flow Low	CPG0465-I-01 Sheet 6							CP-J11	DI	
0087	0	LF-J520A	Level Fault	Sodium Hypochlorite Storage Tank TK-J520A Level Fault	CPG0465-I-01 Sheet 6							CP-J11	DI	
0088	0	LI-J520A	Level Indication	Sodium Hypochlorite Storage Tank TK-J520A Level	CPG0465-I-01 Sheet 6							CP-J11	AI	
0089	0	MM-J520A	Running Status	Sodium Hypochlorite Storage Tank TK-J520A Ventilation Blower Running	CPG0465-I-01 Sheet 6							CP-J11	DI	
0090	0	MN-J520A	Start Command	Sodium Hypochlorite Storage Tank TK-J520A Ventilation Blower Start	CPG0465-I-01 Sheet 6							CP-J11	DO	
0091	0	MM-J520B	Running Status	Sodium Hypochlorite Storage Tank TK-J520A Ventilation Blower Running	CPG0465-I-01 Sheet 6							CP-J11	DI	
0092	0	MN-J520B	Start Command	Sodium Hypochlorite Storage Tank TK-J520A Ventilation Blower Start	CPG0465-I-01 Sheet 6							CP-J11	DO	
0093	0	PA-J520A	Pressure Alarm	Sodium Hypochlorite Storage Tank TK-J520A Ventilation Pressure High	CPG0465-I-01 Sheet 6							CP-J11	DI	
0094	0	YS-J520A	C/O/H Alarm in Computer Position	Sodium Hypochlorite Storage Tank TK-J520A Ventilation Blower in Computer Mode	CPG0465-I-01 Sheet 6							CP-J11	DI	
0095	0	YS-J520B	C/O/H Alarm in Computer Position	Sodium Hypochlorite Storage Tank TK-J520A Ventilation Blower in Computer Mode	CPG0465-I-01 Sheet 6							CP-J11	DI	

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RECORD NO.	REV. NO.	TAG NAME	DESCRIPTION		P&ID DRAWING	I/O SPECIFICATION								
			FUNCTION	SERVICE		ENG. UNITS	SCALE		ALARMS		PLC CABINET	I/O TYPE	I/O ADDRESS	
							LOW	HIGH	LOW	HIGH				
0096	0	FA-J540A	Flow Alarm	Sodium Hypochlorite Storage Tank TK-J540A Ventilation Flow Low	CPG0465-I-01 Sheet 6							CP-J11	DI	
0097	0	LF-J540A	Level Fault	Sodium Hypochlorite Storage Tank TK-J540A Level Fault	CPG0465-I-01 Sheet 6							CP-J11	DI	
0098	0	LI-J540A	Level Indication	Sodium Hypochlorite Storage Tank TK-J540A Level	CPG0465-I-01 Sheet 6							CP-J11	AI	
0099	0	MM-J540A	Running Status	Sodium Hypochlorite Storage Tank TK-J540A Ventilation Blower Running	CPG0465-I-01 Sheet 6							CP-J11	DI	
0100	0	MN-J540A	Start Command	Sodium Hypochlorite Storage Tank TK-J540A Ventilation Blower Start	CPG0465-I-01 Sheet 6							CP-J11	DO	
0101	0	MM-J540B	Running Status	Sodium Hypochlorite Storage Tank TK-J540A Ventilation Blower Running	CPG0465-I-01 Sheet 6							CP-J11	DI	
0102	0	MN-J540B	Start Command	Sodium Hypochlorite Storage Tank TK-J540A Ventilation Blower Start	CPG0465-I-01 Sheet 6							CP-J11	DO	
0103	0	PA-J540A	Pressure Alarm	Sodium Hypochlorite Storage Tank TK-J540A Ventilation Pressure High	CPG0465-I-01 Sheet 6							CP-J11	DI	
0104	0	YS-J540A	C/O/H Alarm in Computer Position	Sodium Hypochlorite Storage Tank TK-J540A Ventilation Blower in Computer Mode	CPG0465-I-01 Sheet 6							CP-J11	DI	
0105	0	YS-J540B	C/O/H Alarm in Computer Position	Sodium Hypochlorite Storage Tank TK-J540A Ventilation Blower in Computer Mode	CPG0465-I-01 Sheet 6							CP-J11	DI	
0106	0	GI-J550B	Gas Indication	Sodium Hypochlorite Storage Room Hydrogen Gas Level	CPG0465-I-01 Sheet 6							CP-J11	AI	
0107	0	LA-J550A	Level Alarm	Sodium Hypochlorite Containmentment Sump High	CPG0465-I-01 Sheet 6							CP-J11	DI	
0108	0	FA-J560A	Flow Alarm	Sodium Hypochlorite Storage Tank TK-J560A Ventilation Flow Low	CPG0465-I-01 Sheet 6							CP-J11	DI	
0109	0	LF-J560A	Level Fault	Sodium Hypochlorite Storage Tank TK-J560A Level Fault	CPG0465-I-01 Sheet 6							CP-J11	DI	
0110	0	LI-J560A	Level Indication	Sodium Hypochlorite Storage Tank TK-J560A Level	CPG0465-I-01 Sheet 6							CP-J11	AI	
0111	0	MM-J560A	Running Status	Sodium Hypochlorite Storage Tank TK-J560A Ventilation Blower Running	CPG0465-I-01 Sheet 6							CP-J11	DI	
0112	0	MN-J560A	Start Command	Sodium Hypochlorite Storage Tank TK-J560A Ventilation Blower Start	CPG0465-I-01 Sheet 6							CP-J11	DO	
0113	0	MM-J560B	Running Status	Sodium Hypochlorite Storage Tank TK-J560A Ventilation Blower Running	CPG0465-I-01 Sheet 6							CP-J11	DI	
0114	0	MN-J560B	Start Command	Sodium Hypochlorite Storage Tank TK-J560A Ventilation Blower Start	CPG0465-I-01 Sheet 6							CP-J11	DO	

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RECORD NO.	REV. NO.	TAG NAME	DESCRIPTION			I/O SPECIFICATION							
			FUNCTION	SERVICE	P&ID DRAWING	ENG. UNITS	SCALE		ALARMS		PLC CABINET	I/O TYPE	I/O ADDRESS
							LOW	HIGH	LOW	HIGH			
0115	0	PA-J560A	Pressure Alarm	Sodium Hypochlorite Storage Tank TK-J560A Ventilation Pressure High	CPG0465-I-01 Sheet 6						CP-J11	DI	
0116	0	YS-J560A	C/O/H Alarm in Computer Position	Sodium Hypochlorite Storage Tank TK-J560A Ventilation Blower in Computer Mode	CPG0465-I-01 Sheet 6						CP-J11	DI	
0117	0	YS-J560B	C/O/H Alarm in Computer Position	Sodium Hypochlorite Storage Tank TK-J560A Ventilation Blower in Computer Mode	CPG0465-I-01 Sheet 6						CP-J11	DI	
0118	0	FI-J610A	Flow Indication	Sodium Hypochlorite to Chlorine Contact Tank Influent Flow Rate	P-01						CP-J11	AI	
0119	0	FQ-J610A	Flow Pulse	Sodium Hypochlorite to Chlorine Contact Tank Influent Flow Total	P-01						CP-J11	DI	
0120	0	MM-J610A	Running Status	Sodium Hypochlorite to Chlorine Contact Tank Pump Running	P-01						CP-J11	DI	
0121	0	MN-J610A	Start Command	Sodium Hypochlorite to Chlorine Contact Tank Pump Start	P-01						CP-J11	DO	
0122	0	SC-J610A	Speed Control Output	Sodium Hypochlorite to Chlorine Contact Tank Pump Required Speed	P-01						CP-J11	AO	
0123	0	SI-J610A	Speed Indication	Sodium Hypochlorite to Chlorine Contact Tank Pump Speed	P-01						CP-J11	AI	
0124	0	UF-J610A	No Fault	Sodium Hypochlorite to Chlorine Contact Tank Pump Fault	P-01						CP-J11	DI	
0125	0	YB-J610A	Close Command	Sodium Hypochlorite Pump P-J610A Outlet Control Valve Close	P-01						CP-J11	DO	
0126	0	YD-J610A	Open Command	Sodium Hypochlorite Pump P-J610A Outlet Control Valve Open	P-01						CP-J11	DO	
0127	0	YS-J610A	C/O/H Switch in Computer Position	Sodium Hypochlorite to Chlorine Contact Tank Pump in Computer Mode	P-01						CP-J11	DI	
0128	0	YS-J610B	C/O/H Switch in Computer Position	Sodium Hypochlorite Pump P-J610A Outlet Control Valve in Computer Mode	P-01						CP-J11	DI	
0129	0	ZA-J610A	Closed Status	Sodium Hypochlorite Pump P-J610A Outlet Control Valve Closed	P-01						CP-J11	DI	
0130	0	ZD-J610A	Open Status	Sodium Hypochlorite Pump P-J610A Outlet Control Valve Open	P-01						CP-J11	DI	
0131	0	ZS-J610A	Revolution Sensor	Sodium Hypochlorite to Chlorine Contact Tank Pump Revolution	P-01						CP-J11	DI	
0132	0	MM-J620A	Running Status	Sodium Hypochlorite to Chlorine Contact Tank Pump Running	P-01						CP-J11	DI	
0133	0	MN-J620A	Start Command	Sodium Hypochlorite to Chlorine Contact Tank Pump Start	P-01						CP-J11	DO	
0134	0	SC-J620A	Speed Control Output	Sodium Hypochlorite to Chlorine Contact Tank Pump Required Speed	P-01						CP-J11	AO	
0135	0	SI-J620A	Speed Indication	Sodium Hypochlorite to Chlorine Contact Tank Pump Speed	P-01						CP-J11	AI	
0136	0	UF-J620A	No Fault	Sodium Hypochlorite to Chlorine Contact Tank Pump Fault	P-01						CP-J11	DI	
0137	0	YB-J620A	Close Command	Sodium Hypochlorite Pump P-J620A Outlet Control Valve Close	P-01						CP-J11	DO	
0138	0	YD-J620A	Open Command	Sodium Hypochlorite Pump P-J620A Outlet Control Valve Open	P-01						CP-J11	DO	
0139	0	YS-J620A	C/O/H Switch in Computer Position	Sodium Hypochlorite to Chlorine Contact Tank Pump in Computer Mode	P-01						CP-J11	DI	
0140	0	YS-J620B	C/O/H Switch in Computer Position	Sodium Hypochlorite Pump P-J620A Outlet Control Valve in Computer Mode	P-01						CP-J11	DI	
0141	0	ZA-J620A	Closed Status	Sodium Hypochlorite Pump P-J620A Outlet Control Valve Closed	P-01						CP-J11	DI	
0142	0	ZD-J620A	Open Status	Sodium Hypochlorite Pump P-J620A Outlet Control Valve Open	P-01						CP-J11	DI	
0143	0	ZS-J620A	Revolution Sensor	Sodium Hypochlorite to Chlorine Contact Tank Pump Revolution Sensor	P-01						CP-J11	DI	
0144	0	FI-J640A	Flow Indication	Sodium Hypochlorite to Filtered Water Channel Flow Rate	P-01						CP-J11	AI	
0145	0	FQ-J640A	Flow Pulse	Sodium Hypochlorite to Filtered Water Channel Flow Total	P-01						CP-J11	DI	
0146	0	MM-J640A	Running Status	Sodium Hypochlorite to Filtered Water Channel Pump Running	P-01						CP-J11	DI	
0147	0	MN-J640A	Start Command	Sodium Hypochlorite to Filtered Water Channel Pump Start	P-01						CP-J11	DO	
0148	0	SC-J640A	Speed Control Output	Sodium Hypochlorite to Filtered Water Channel Pump Required Speed	P-01						CP-J11	AO	
0149	0	SI-J640A	Speed Indication	Sodium Hypochlorite to Filtered Water Channel Pump Speed	P-01						CP-J11	AI	

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RECORD NO.	REV. NO.	TAG NAME	DESCRIPTION			I/O SPECIFICATION							
			FUNCTION	SERVICE	P&ID DRAWING	ENG. UNITS	SCALE		ALARMS		PLC CABINET	I/O TYPE	I/O ADDRESS
							LOW	HIGH	LOW	HIGH			
0150	0	UF-J640A	No Fault	Sodium Hypochlorite to Filtered Water Channel Pump Fault	P-01						CP-J11	DI	
0151	0	YB-J640A	Close Command	Sodium Hypochlorite Pump P-J640A Outlet Control Valve Close	P-01						CP-J11	DO	
0152	0	YD-J640A	Open Command	Sodium Hypochlorite Pump P-J640A Outlet Control Valve Open	P-01						CP-J11	DO	
0153	0	YS-J640A	C/O/H Switch in Computer Position	Sodium Hypochlorite to Filtered Water Channel Pump in Computer Mode	P-01						CP-J11	DI	
0154	0	YS-J640B	C/O/H Switch in Computer Position	Sodium Hypochlorite Pump P-J640A Outlet Control Valve in Computer Mode	P-01						CP-J11	DI	
0155	0	ZA-J640A	Closed Status	Sodium Hypochlorite Pump P-J640A Outlet Control Valve Clsed	P-01						CP-J11	DI	
0156	0	ZD-J640A	Open Status	Sodium Hypochlorite Pump P-J640A Outlet Control Valve Open	P-01						CP-J11	DI	
0157	0	ZS-J640A	Revolution Sensor	Sodium Hypochlorite to Filtered Water Channel Pump Pump Revolution	P-01						CP-J11	DI	
0158	0	MM-J660A	Running Status	Sodium Hypochlorite to Filtered Water Channel Pump Running	P-01						CP-J11	DI	
0159	0	MN-J660A	Start Command	Sodium Hypochlorite to Filtered Water Channel Pump Start	P-01						CP-J11	DO	
0160	0	SC-J660A	Speed Control Output	Sodium Hypochlorite to Filtered Water Channel Pump Required Speed	P-01						CP-J11	AO	
0161	0	SI-J660A	Speed Indication	Sodium Hypochlorite to Filtered Water Channel Pump Speed	P-01						CP-J11	AI	
0162	0	UF-J660A	No Fault	Sodium Hypochlorite to Filtered Water Channel Pump Fault	P-01						CP-J11	DI	
0163	0	YB-J660A	Close Command	Sodium Hypochlorite Pump P-J660A Outlet Control Valve Closed	P-01						CP-J11	DO	
0164	0	YD-J660A	Open Command	Sodium Hypochlorite Pump P-J660A Outlet Control Valve Open	P-01						CP-J11	DO	
0165	0	YS-J660A	C/O/H Switch in Computer Position	Sodium Hypochlorite to Filtered Water Channel Pump in Computer Mode	P-01						CP-J11	DI	
0166	0	YS-J660B	C/O/H Switch in Computer Position	Sodium Hypochlorite Pump P-J660A Outlet Control Valve in Computer Mode	P-01						CP-J11	DI	
0167	0	ZA-J660A	Closed Status	Sodium Hypochlorite Pump P-J660A Outlet Control Valve Closed	P-01						CP-J11	DI	
0168	0	ZD-J660A	Open Status	Sodium Hypochlorite Pump P-J660A Outlet Control Valve Open	P-01						CP-J11	DI	
0169	0	ZS-J660A	Revolution Sensor	Sodium Hypochlorite to Filtered Water Channel Pump Pump Revolution	P-01						CP-J11	DI	
				HVAC Alarms							CP-J12	DI	
				HVAC Alarms							CP-J12	DI	
				HVAC Alarms							CP-J12	DI	
				HVAC Alarms							CP-J12	DI	
				HVAC Alarms							CP-J12	DI	
				HVAC Alarms							CP-J12	DI	
				HVAC Alarms							CP-J12	DI	
				HVAC Alarms							CP-J12	DI	
				HVAC Alarms							CP-J12	DI	
				HVAC Alarms							CP-J12	DI	
				HVAC Alarms							CP-J12	DI	
				HVAC Alarms							CP-J12	DI	
				HVAC Alarms							CP-J12	DI	
				HVAC Alarms							CP-J12	DI	
				To be confirmed							CP-J12	DI	
				To be confirmed							CP-J12	DI	
				To be confirmed							CP-J12	DI	
				To be confirmed							CP-J12	DO	
				To be confirmed							CP-J12	DO	

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RECORD NO.	REV. NO.	TAG NAME	DESCRIPTION		P&ID DRAWING	I/O SPECIFICATION								
			FUNCTION	SERVICE		ENG. UNITS	SCALE		ALARMS		PLC CABINET	I/O TYPE	I/O ADDRESS	
							LOW	HIGH	LOW	HIGH				
				To be confirmed								CP-J12	DO	
				To be confirmed								CP-J12	DO	
				To be confirmed								CP-J12	DO	
				To be confirmed								CP-J12	DO	
				To be confirmed								CP-J12	DO	
				To be confirmed								CP-J12	DO	
				To be confirmed								CP-J12	DO	
				To be confirmed								CP-J12	AI	
				To be confirmed								CP-J12	AI	
				To be confirmed								CP-J12	AI	
				To be confirmed								CP-J12	AI	
				To be confirmed								CP-J12	AI	
				To be confirmed								CP-J12	AI	
				To be confirmed								CP-J12	AI	
				To be confirmed								CP-J12	AI	
0170	0	HS-S200A	Hand Switch	Bulk Sulphuric Acid Storage Tank TK-S210A Select Tank to Fill From Rail Car	WS-P0001							LCP-S11	DI	
0171	0	HS-S200B	Hand Switch	Bulk Sulphuric Acid Storage Tank TK-S220A Select Tank to Fill From Rail Car	WS-P0001							LCP-S11	DI	
0172	0	HS-S200C	Hand Switch	Bulk Sulphuric Acid Storage Tank TK-S210A or TK-S220A Start Fill From Rail Car	WS-P0001							LCP-S11	DI	
0173	0	HS-S200D	Hand Switch	Start Steam System for Sulphuric Acid Rail Car	WS-P0001							LCP-S11	DI	
0174	0	HS-S200E	Hand Switch	Bulk Sulphuric Acid Storage Tank Start Air Purge	WS-P0001							LCP-S11	DI	
0175	0	HS-S200F	Hand Switch	Bulk Sulphuric Acid Storage Tank Fill System Stop	WS-P0001							LCP-S11	DI	
0176	0	XM-S200A	Lamp Output	Bulk Sulphuric Acid Storage Tank Air Purge Complete	WS-P0001							LCP-S11	DO	
0177	0	YD-S200A	Open Command	Open Fill Valve SOL-S200A	WS-P0001							LCP-S11	DO	
0178	0	HS-S204A	Hand Switch	Bulk Sulphuric Acid Storage Tank TK-S210A Select Tank to Fill From Truck	WS-P0001							LCP-S11	DI	
0179	0	HS-S204B	Hand Switch	Bulk Sulphuric Acid Storage Tank TK-S220A Select Tank to Fill From Truck	WS-P0001							LCP-S11	DI	
0180	0	HS-S204C	Hand Switch	Bulk Sulphuric Acid Storage Tank TK-S210A or TK-S220A Start Fill From Truck	WS-P0001							LCP-S11	DI	
0181	0	HS-S204D	Hand Switch	Bulk Sulphuric Acid Storage Tank Start Air Purge	WS-P0001							LCP-S11	DI	
0182	0	HS-S204E	Hand Switch	Bulk Sulphuric Acid Storage Tank Fill System Stop	WS-P0001							LCP-S11	DI	
0183	0	YD-S204A	Open Command	Open Fill Valve SOL-S204A	WS-P0001							LCP-S11	DO	
0184	0	LA-S206A	Level Alarm	Sulphuric Acid Spill Containment Manhole Level	WS-P0001							LCP-S11	DI	
0185	0	YD-S206A	Open Command	Sulphuric Acid Spill Containment Manhole Outlet Flow Valve Open	WS-P0001							LCP-S11	DO	
0186	0	YB-S206A	Close Command	Sulphuric Acid Spill Containment Manhole Outlet Flow Valve Close	WS-P0001							LCP-S11	DO	
0187	0	YS-S206A	C/O/H Switch in Computer Position	Sulphuric Acid Spill Containment Manhole Outlet Flow Valve in Computer Mode	WS-P0001							LCP-S11	DI	
0188	0	ZD-S206A	Open Status	Sulphuric Acid Spill Containment Manhole Outlet Flow Valve Open	WS-P0001							LCP-S11	DI	
0189	0	ZB-S206A	Closed Status	Sulphuric Acid Spill Containment Manhole Outlet Flow Valve Closed	WS-P0001							LCP-S11	DI	

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			FUNCTION	SERVICE	P&ID DRAWING	ENG. UNITS	SCALE		ALARMS		PLC CABINET	I/O TYPE	I/O ADDRESS
							LOW	HIGH	LOW	HIGH			
0190	0	YD-S207A	Open Command	Sulphuric Acid Spill Containment to North Sump Inlet Flow Valve Open	WS-P0001						LCP-S11	DO	
0191	0	YB-S207A	Close Command	Sulphuric Acid Spill Containment to North Sump Inlet Flow Valve Close	WS-P0001						LCP-S11	DO	
0192	0	YS-S207A	C/O/H Switch in Computer Position	Sulphuric Acid Spill Containment to North Sump Inlet Flow Valve in Computer Mode	WS-P0001						LCP-S11	DI	
0193	0	ZD-S207A	Open Status	Sulphuric Acid Spill Containment to North Sump Inlet Flow Valve Open	WS-P0001						LCP-S11	DI	
0194	0	ZB-S207A	Closed Status	Sulphuric Acid Spill Containment to North Sump Inlet Flow Valve Closed	WS-P0001						LCP-S11	DI	
0195	0	LA-S210A	Level Alarm	Bulk Sulphuric Acid Storage Tank TK-S210A Remote High Level	WS-P0001						LCP-S11	DO	
0196	0	LA-S210B	Level Alarm	Bulk Sulphuric Acid Storage Tank TK-S210A Remote High Level	WS-P0001						LCP-S11	DO	
0197	0	XM-S204A	Lamp Output	Bulk Sulphuric Acid Storage Tank Air Purge Complete	WS-P0001						LCP-S11	DO	
0198	0	YB-S210A	Close Command	Bulk Sulphuric Acid Storage Tank TK-S210A Inlet Flow Valve Close	WS-P0001						LCP-S11	DO	
0199	0	YD-S210A	Open Command	Bulk Sulphuric Acid Storage Tank TK-S210A Inlet Flow Valve Open	WS-P0001						LCP-S11	DO	
0200	0	YB-S210B	Close Command	Bulk Sulphuric Acid Storage Tank TK-S210A Inlet Flow Valve Close	WS-P0001						LCP-S11	DO	
0201	0	YD-S210B	Open Command	Bulk Sulphuric Acid Storage Tank TK-S210A Inlet Flow Valve Open	WS-P0001						LCP-S11	DO	
0202	0	ZD-S210A	Open Status	Bulk Sulphuric Acid Storage Tank TK-S210A Inlet Flow Valve Open	WS-P0001						LCP-S11	DI	
0203	0	ZB-S210A	Closed Status	Bulk Sulphuric Acid Storage Tank TK-S210A Inlet Flow Valve Closed	WS-P0001						LCP-S11	DI	
0204	0	ZD-S210B	Open Status	Bulk Sulphuric Acid Storage Tank TK-S210A Inlet Flow Valve Open	WS-P0001						LCP-S11	DI	
0205	0	ZB-S210B	Closed Status	Bulk Sulphuric Acid Storage Tank TK-S210A Inlet Flow Valve Closed	WS-P0001						LCP-S11	DI	
0206	0	ZD-S210C	Open Status	Bulk Sulphuric Acid Storage Tank TK-S210A Inlet Valve Open	WS-P0001						LCP-S11	DO	
0207	0	ZD-S210D	Open Status	Bulk Sulphuric Acid Storage Tank TK-S210A Inlet Valve Open	WS-P0001						LCP-S11	DO	
0208	0	LA-S220A	Level Alarm	Bulk Sulphuric Acid Storage Tank TK-S220A Remote High Level	WS-P0001						LCP-S11	DO	
0209	0	LA-S220B	Level Alarm	Bulk Sulphuric Acid Storage Tank TK-S220A Remote High Level	WS-P0001						LCP-S11	DO	
0210	0	YB-S220A	Close Command	Bulk Sulphuric Acid Storage Tank TK-S220A Inlet Flow Valve Close	WS-P0001						LCP-S11	DO	
0211	0	YD-S220A	Open Command	Bulk Sulphuric Acid Storage Tank TK-S220A Inlet Flow Valve Open	WS-P0001						LCP-S11	DO	
0212	0	YB-S220B	Close Command	Bulk Sulphuric Acid Storage Tank TK-S220A Inlet Flow Valve Close	WS-P0001						LCP-S11	DO	
0213	0	YD-S220B	Open Command	Bulk Sulphuric Acid Storage Tank TK-S220A Inlet Flow Valve Open	WS-P0001						LCP-S11	DO	
0214	0	ZD-S220A	Open Status	Bulk Sulphuric Acid Storage Tank TK-S220A Inlet Flow Valve Open	WS-P0001						LCP-S11	DI	
0215	0	ZB-S220A	Closed Status	Bulk Sulphuric Acid Storage Tank TK-S220A Inlet Flow Valve Closed	WS-P0001						LCP-S11	DI	
0216	0	ZD-S220B	Open Status	Bulk Sulphuric Acid Storage Tank TK-S220A Inlet Flow Valve Open	WS-P0001						LCP-S11	DI	
0217	0	ZB-S220B	Closed Status	Bulk Sulphuric Acid Storage Tank TK-S220A Inlet Flow Valve Closed	WS-P0001						LCP-S11	DI	
0218	0	ZD-S220C	Open Status	Bulk Sulphuric Acid Storage Tank TK-S220A Inlet Valve Open	WS-P0001						LCP-S11	DO	
0219	0	ZD-S220D	Open Status	Bulk Sulphuric Acid Storage Tank TK-S220A Inlet Valve Open	WS-P0001						LCP-S11	DO	
0220	0	FA-S750A	Flow Alarm	Emergency Shower Operating EEWS-S750A	WS-P0001						LCP-S11	DI	
0221	0	FA-S758A	Flow Alarm	Emergency Shower Operating EEWS-S758A	WS-P0001						LCP-S11	DI	
0222	0	LF-S210A	Level Fault	Bulk Sulphuric Acid Storage Tank TK-S210A Level Fault	WS-P0002						LCP-S11	DI	
0223	0	LI-S210B	Level Indicator	Bulk Sulphuric Acid Storage Tank TK-S210A Level	WS-P0002						LCP-S11	AI	
0224	0	LI-S210D	Level Indicator	Bulk Sulphuric Acid Storage Tank TK-S210A Level	WS-P0002						LCP-S11	AI	
0225	0	YS-S210C	C/O/H Switch in Computer Position	Bulk Sulphuric Acid Storage Tank TK-S210A in Computer Mode	WS-P0002						LCP-S11	DI	
0226	0	YB-S210C	Close Command	Bulk Sulphuric Acid Storage Tank TK-S210A Outlet Flow Valve Close	WS-P0002						LCP-S11	DO	

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RECORD NO.	REV. NO.	TAG NAME	DESCRIPTION			P&ID DRAWING	I/O SPECIFICATION							
			FUNCTION	SERVICE	ENG. UNITS		SCALE		ALARMS		PLC CABINET	I/O TYPE	I/O ADDRESS	
							LOW	HIGH	LOW	HIGH				
0227	0	YD-S210C	Open Command	Bulk Sulphuric Acid Storage Tank TK-S210A Outlet Flow Valve Open	WS-P0002							LCP-S11	DO	
0228	0	ZD-S210C	Open Status	Bulk Sulphuric Acid Storage Tank TK-S210A Outlet Flow Valve Open	WS-P0002							LCP-S11	DI	
0229	0	ZB-S210C	Closed Status	Bulk Sulphuric Acid Storage Tank TK-S210A Outlet Flow Valve Closed	WS-P0002							LCP-S11	DI	
0230	0	LF-S220A	Level Fault	Bulk Sulphuric Acid Storage Tank TK-S220A Level Fault	WS-P0002							LCP-S11	DI	
0231	0	LI-S220B	Level Indicator	Bulk Sulphuric Acid Storage Tank TK-S220A Level	WS-P0002							LCP-S11	AI	
0232	0	LI-S220D	Level Indicator	Bulk Sulphuric Acid Storage Tank TK-S220A Level	WS-P0002							LCP-S11	AI	
0233	0	YS-S220C	C/O/H Switch in Computer Position	Bulk Sulphuric Acid Storage Tank TK-S220A in Computer Mode	WS-P0002							LCP-S11	DI	
0234	0	YB-S220C	Close Command	Bulk Sulphuric Acid Storage Tank TK-S220A Outlet Flow Valve Closed	WS-P0002							LCP-S11	DO	
0235	0	YD-S220C	Open Command	Bulk Sulphuric Acid Storage Tank TK-S220A Outlet Flow Valve Open	WS-P0002							LCP-S11	DO	
0236	0	ZD-S220C	Open Status	Bulk Sulphuric Acid Storage Tank TK-S220A Outlet Flow Valve Open	WS-P0002							LCP-S11	DI	
0237	0	ZB-S220C	Closed Status	Bulk Sulphuric Acid Storage Tank TK-S220A Outlet Flow Valve Closed	WS-P0002							LCP-S11	DI	
0238	0	LA-S260B	Level Alarm	Bulk Sulphuric Acid Containment High Level	WS-P0002							LCP-S11	DI	
0239	0	LA-S260B	Level Alarm	Bulk Sulphuric Acid Containment High Level Visual Alarm	WS-P0002							LCP-S11	DO	
0240	0	FA-S755A	Flow Alarm	Emergency Shower Operating EEWS-S755A	WS-P0002							LCP-S11	DI	
0241	0	MM-S230A	Running Status	Sulphuric Acid Feed Pump P-S230A Running	WS-P0003							LCP-S11	DI	
0242	0	MN-S230A	Start Command	Sulphuric Acid Feed Pump P-S230A Start	WS-P0003							LCP-S11	DO	
0243	0	SI-S230A	Speed Indication	Sulphuric Acid Feed Pump P-S230A Speed	WS-P0003							LCP-S11	AI	
0244	0	SC-S230A	Speed Control Output	Sulphuric Acid Feed Pump P-S230A Required Speed	WS-P0003							LCP-S11	AO	
0245	0	UF-S230A	No Fault	Sulphuric Acid Feed Pump P-S230A Fault	WS-P0003							LCP-S11	DI	
0246	0	YS-S230A	C/O/H Switch in Computer Position	Sulphuric Acid Feed Pump P-S230A in Computer Mode	WS-P0003							LCP-S11	DI	
0247	0	FI-S235A	Flow Indication	Sulphuric Acid Feed Pump P-S230A Outlet Flow Rate	WS-P0003							LCP-S11	AI	
0248	0	FQ-S235A	Flow Pulse	Sulphuric Acid Feed Pump P-S230A Outlet Flow Total	WS-P0003							LCP-S11	DI	
0249	0	MM-S240A	Running Status	Sulphuric Acid Feed Pump P-S240A Running	WS-P0003							LCP-S11	DI	
0250	0	MN-S240A	Start Command	Sulphuric Acid Feed Pump P-S240A Start	WS-P0003							LCP-S11	DO	
0251	0	SI-S240A	Speed Indication	Sulphuric Acid Feed Pump P-S240A Speed	WS-P0003							LCP-S11	AI	
0252	0	SC-S240A	Speed Control Output	Sulphuric Acid Feed Pump P-S240A Required Speed	WS-P0003							LCP-S11	AO	
0253	0	UF-S240A	No Fault	Sulphuric Acid Feed Pump P-S240A Fault	WS-P0003							LCP-S11	DI	
0254	0	YS-S240A	C/O/H Switch in Computer Position	Sulphuric Acid Feed Pump P-S240A in Computer Mode	WS-P0003							LCP-S11	DI	
0255	0	YD-S240A	Open Command	Standby Sulphuric Acid Feed Pump P-S240A Open	WS-P0003							LCP-S11	DO	
0256	0	YB-S240A	Close Command	Standby Sulphuric Acid Feed Pump P-S240A Close	WS-P0003							LCP-S11	DO	
0257	0	YS-S240B	C/O/H Switch in Computer Position	Standby Sulphuric Acid Feed Pump P-S240A in Computer Mode	WS-P0003							LCP-S11	DI	
0258	0	YD-S240B	Open Command	Standby Sulphuric Acid Feed Pump P-S240A Open	WS-P0003							LCP-S11	DO	
0259	0	YB-S240B	Close Command	Standby Sulphuric Acid Feed Pump P-S240A Close	WS-P0003							LCP-S11	DO	
0260	0	YS-S240C	C/O/H Switch in Computer Position	Standby Sulphuric Acid Feed Pump P-S240A in Computer Mode	WS-P0003							LCP-S11	DI	
0261	0	ZB-S240A	Closed Status	Standby Sulphuric Acid Feed Pump P-S240A Outlet Control Valve Closed	WS-P0003							LCP-S11	DI	
0262	0	ZD-S240A	Open Status	Standby Sulphuric Acid Feed Pump P-S240A Outlet Control Valve Open	WS-P0003							LCP-S11	DI	
0263	0	ZB-S240B	Closed Status	Standby Sulphuric Acid Feed Pump P-S240A Outlet Control Valve Closed	WS-P0003							LCP-S11	DI	
0264	0	ZD-S240B	Open Status	Standby Sulphuric Acid Feed Pump P-S240A Outlet Control Valve Open	WS-P0003							LCP-S11	DI	

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RECORD NO.	REV. NO.	TAG NAME	DESCRIPTION			I/O SPECIFICATION							
			FUNCTION	SERVICE	P&ID DRAWING	ENG. UNITS	SCALE		ALARMS		PLC CABINET	I/O TYPE	I/O ADDRESS
							LOW	HIGH	LOW	HIGH			
0265	0	MM-S250A	Running Status	Sulphuric Acid Feed Pump P-S250A Running	WS-P0003						LCP-S11	DI	
0266	0	MN-S250A	Start Command	Sulphuric Acid Feed Pump P-S250A Start	WS-P0003						LCP-S11	DO	
0267	0	SI-S250A	Speed Indication	Sulphuric Acid Feed Pump P-S250A Speed	WS-P0003						LCP-S11	AI	
0268	0	SC-S250A	Speed Control Output	Sulphuric Acid Feed Pump P-S250A Required Speed	WS-P0003						LCP-S11	AO	
0269	0	UF-S250A	No Fault	Sulphuric Acid Feed Pump P-S250A Fault	WS-P0003						LCP-S11	DI	
0270	0	YS-S250A	C/O/H Switch in Computer Position	Sulphuric Acid Feed Pump P-S250A in Computer Mode	WS-P0003						LCP-S11	DI	
0271	0	FI-S255A	Flow Indication	Sulphuric Acid Feed Pump P-S250A Outlet Flow Rate	WS-P0003						LCP-S11	AI	
0272	0	FO-S255A	Flow Pulse	Sulphuric Acid Feed Pump P-S250A Outlet Flow Total	WS-P0003						LCP-S11	DI	
0273	0	LA-S260A	Level Alarm	Sulphuric Acid Spill Containment High Level	WS-P0003						LCP-S11	DI	
0274	0	HS-S100B	Hand Switch	Select Bulk Ferric Chloride Storage Tank TK-S110A to Fill	WS-P0004						LCP-S11	DI	
0275	0	HS-S100C	Hand Switch	Select Bulk Ferric Chloride Storage Tank TK-S120A to Fill	WS-P0004						LCP-S11	DI	
0276	0	HS-S100D	Hand Switch	Select Bulk Ferric Chloride Storage Tank TK-S130A to Fill	WS-P0004						LCP-S11	DI	
0277	0	HS-S100E	Hand Switch	Select Bulk Ferric Chloride Storage Tank TK-S140A to Fill	WS-P0004						LCP-S11	DI	
0278	0	HS-S100A	Hand Switch	Selected Bulk Ferric Chloride Storage Tank Start Fill	WS-P0004						LCP-S11	DI	
0279	0	HS-S100F	Hand Switch	Bulk Ferric Chloride Storage Tank Start Air Purge	WS-P0004						LCP-S11	DI	
0280	0	HS-S100G	Hand Switch	Bulk Ferric Chloride Storage Tank Fill System Stop	WS-P0004						LCP-S11	DI	
0281	0	XM-S100A	Lamp Output	Bulk Ferric Chloride Storage Tank Air Purge Complete	WS-P0004						LCP-S11	DO	
0282	0	YD-S100A	Open Command	Open Fill Valve for Bulk Ferric Chloride Rail Car	WS-P0004						LCP-S11	DO	
0283	0	HS-S105B	Hand Switch	Select Bulk Ferric Chloride Storage Tank TK-S110A to Fill	WS-P0004						LCP-S11	DI	
0284	0	HS-S105C	Hand Switch	Select Bulk Ferric Chloride Storage Tank TK-S120A to Fill	WS-P0004						LCP-S11	DI	
0285	0	HS-S105D	Hand Switch	Select Bulk Ferric Chloride Storage Tank TK-S130A to Fill	WS-P0004						LCP-S11	DI	
0286	0	HS-S105E	Hand Switch	Select Bulk Ferric Chloride Storage Tank TK-S140A to Fill	WS-P0004						LCP-S11	DI	
0287	0	HS-S105A	Hand Switch	Selected Bulk Ferric Chloride Storage Tank Start Fill	WS-P0004						LCP-S11	DI	
0288	0	HS-S105F	Hand Switch	Bulk Ferric Chloride Storage Tank Start Air Purge	WS-P0004						LCP-S11	DI	
0289	0	HS-S105G	Hand Switch	Bulk Ferric Chloride Storage Tank Fill System Stop	WS-P0004						LCP-S11	DI	
0290	0	XM-S105A	Lamp Output	Bulk Ferric Chloride Storage Tank Air Purge Complete	WS-P0004						LCP-S11	DO	
0291	0	YD-S105A	Open Command	Open Fill Valve for Bulk Ferric Chloride Rail Car	WS-P0004						LCP-S11	DO	
0292	0	YD-S107A	Open Command	Ferric Chloride Spill Containment to North Sump Inlet Flow Valve Open	WS-P0004						LCP-S11	DO	
0293	0	YB-S107A	Close Command	Ferric Chloride Spill Containment to North Sump Inlet Flow Valve Close	WS-P0004						LCP-S11	DO	
0294	0	YS-S107A	C/O/H Switch in Computer Position	Ferric Chloride Spill Containment to North Sump Inlet Flow Valve in Computer Mode	WS-P0004						LCP-S11	DI	
0295	0	ZD-S107A	Open Status	Ferric Chloride Spill Containment to North Sump Inlet Flow Valve Open	WS-P0004						LCP-S11	DI	
0296	0	ZB-S107A	Closed Status	Ferric Chloride Spill Containment to North Sump Inlet Flow Valve Closed	WS-P0004						LCP-S11	DI	
0297	0	LA-S110A	Level Alarm	Bulk Ferric Chloride Storage Tank TK-S110A High Level	WS-P0004						LCP-S11	DO	
0298	0	LA-S110B	Level Alarm	Bulk Ferric Chloride Storage Tank TK-S110A High Level	WS-P0004						LCP-S11	DO	
0299	0	YB-S110A	Close Command	Bulk Ferric Chloride Storage Tank TK-S110A Inlet Flow Valve Close	WS-P0004						LCP-S11	DO	
0300	0	YD-S110A	Open Command	Bulk Ferric Chloride Storage Tank TK-S110A Inlet Flow Valve Open	WS-P0004						LCP-S11	DO	
0301	0	YB-S110B	Close Command	Bulk Ferric Chloride Storage Tank TK-S110A Inlet Flow Valve Close	WS-P0004						LCP-S11	DO	

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RECORD NO.	REV. NO.	TAG NAME	DESCRIPTION			P&ID DRAWING	I/O SPECIFICATION						
			FUNCTION	SERVICE	ENG. UNITS		SCALE		ALARMS		PLC CABINET	I/O TYPE	I/O ADDRESS
							LOW	HIGH	LOW	HIGH			
0302	0	YD-S110B	Open Command	Bulk Ferric Chloride Storage Tank TK-S110A Inlet Flow Valve Open	WS-P0004						LCP-S11	DO	
0303	0	ZD-S110A	Open Status	Bulk Ferric Chloride Storage Tank TK-S110A Inlet Flow Valve Open	WS-P0004						LCP-S11	DI	
0304	0	ZB-S110A	Closed Status	Bulk Ferric Chloride Storage Tank TK-S110A Inlet Flow Valve Closed	WS-P0004						LCP-S11	DI	
0305	0	ZD-S110B	Open Status	Bulk Ferric Chloride Storage Tank TK-S110A Inlet Flow Valve Open	WS-P0004						LCP-S11	DI	
0306	0	ZB-S110B	Closed Status	Bulk Ferric Chloride Storage Tank TK-S110A Inlet Flow Valve Closed	WS-P0004						LCP-S11	DI	
0307	0	ZD-S110A	Open Status	Bulk Ferric Chloride Storage Tank TK-S110A Inlet Valve Open	WS-P0004						LCP-S11	DO	
0308	0	ZD-S110B	Open Status	Bulk Ferric Chloride Storage Tank TK-S110A Inlet Valve Open	WS-P0004						LCP-S11	DO	
0309	0	LA-S120A	Level Alarm	Bulk Ferric Chloride Storage Tank TK-S120A High Level	WS-P0004						LCP-S11	DO	
0310	0	LA-S120B	Level Alarm	Bulk Ferric Chloride Storage Tank TK-S120A High Level	WS-P0004						LCP-S11	DO	
0311	0	YB-S120A	Close Command	Bulk Ferric Chloride Storage Tank TK-S120A Inlet Flow Valve Close	WS-P0004						LCP-S11	DO	
0312	0	YD-S120A	Open Command	Bulk Ferric Chloride Storage Tank TK-S120A Inlet Flow Valve Open	WS-P0004						LCP-S11	DO	
0313	0	YB-S120B	Close Command	Bulk Ferric Chloride Storage Tank TK-S120A Inlet Flow Valve Close	WS-P0004						LCP-S11	DO	
0314	0	YD-S120B	Open Command	Bulk Ferric Chloride Storage Tank TK-S120A Inlet Flow Valve Open	WS-P0004						LCP-S11	DO	
0315	0	ZD-S120A	Open Status	Bulk Ferric Chloride Storage Tank TK-S120A Inlet Flow Valve Open	WS-P0004						LCP-S11	DI	
0316	0	ZB-S120A	Closed Status	Bulk Ferric Chloride Storage Tank TK-S120A Inlet Flow Valve Closed	WS-P0004						LCP-S11	DI	
0317	0	ZD-S120B	Open Status	Bulk Ferric Chloride Storage Tank TK-S120A Inlet Flow Valve Open	WS-P0004						LCP-S11	DI	
0318	0	ZB-S120B	Closed Status	Bulk Ferric Chloride Storage Tank TK-S120A Inlet Flow Valve Closed	WS-P0004						LCP-S11	DI	
0319	0	ZD-S120A	Open Status	Bulk Ferric Chloride Storage Tank TK-S120A Inlet Valve Open	WS-P0004						LCP-S11	DO	
0320	0	ZD-S120B	Open Status	Bulk Ferric Chloride Storage Tank TK-S120A Inlet Valve Open	WS-P0004						LCP-S11	DO	
0321	0	LA-S130A	Level Alarm	Bulk Ferric Chloride Storage Tank TK-S130A High Level	WS-P0004						LCP-S11	DO	
0322	0	LA-S130B	Level Alarm	Bulk Ferric Chloride Storage Tank TK-S130A High Level	WS-P0004						LCP-S11	DO	
0323	0	YB-S130A	Close Command	Bulk Ferric Chloride Storage Tank TK-S130A Inlet Flow Valve Close	WS-P0004						LCP-S11	DO	
0324	0	YD-S130A	Open Command	Bulk Ferric Chloride Storage Tank TK-S130A Inlet Flow Valve Open	WS-P0004						LCP-S11	DO	
0325	0	YB-S130B	Close Command	Bulk Ferric Chloride Storage Tank TK-S130A Inlet Flow Valve Close	WS-P0004						LCP-S11	DO	
0326	0	YD-S130B	Open Command	Bulk Ferric Chloride Storage Tank TK-S130A Inlet Flow Valve Open	WS-P0004						LCP-S11	DO	
0327	0	ZD-S130A	Open Status	Bulk Ferric Chloride Storage Tank TK-S130A Inlet Flow Valve Open	WS-P0004						LCP-S11	DI	
0328	0	ZB-S130A	Closed Status	Bulk Ferric Chloride Storage Tank TK-S130A Inlet Flow Valve Closed	WS-P0004						LCP-S11	DI	
0329	0	ZD-S130B	Open Status	Bulk Ferric Chloride Storage Tank TK-S130A Inlet Flow Valve Open	WS-P0004						LCP-S11	DI	
0330	0	ZB-S130B	Closed Status	Bulk Ferric Chloride Storage Tank TK-S130A Inlet Flow Valve Closed	WS-P0004						LCP-S11	DI	
0331	0	ZD-S130A	Open Status	Bulk Ferric Chloride Storage Tank TK-S130A Inlet Valve Open	WS-P0004						LCP-S11	DO	
0332	0	ZD-S130B	Open Status	Bulk Ferric Chloride Storage Tank TK-S130A Inlet Valve Open	WS-P0004						LCP-S11	DO	
0333	0	LA-S140A	Level Alarm	Bulk Ferric Chloride Storage Tank TK-S140A High Level	WS-P0004						LCP-S11	DO	
0334	0	LA-S140B	Level Alarm	Bulk Ferric Chloride Storage Tank TK-S140A High Level	WS-P0004						LCP-S11	DO	
0335	0	YB-S140A	Close Command	Bulk Ferric Chloride Storage Tank TK-S140A Inlet Flow Valve Close	WS-P0004						LCP-S11	DO	
0336	0	YD-S140A	Open Command	Bulk Ferric Chloride Storage Tank TK-S140A Inlet Flow Valve Open	WS-P0004						LCP-S11	DO	
0337	0	YB-S140B	Close Command	Bulk Ferric Chloride Storage Tank TK-S140A Inlet Flow Valve Close	WS-P0004						LCP-S11	DO	
0338	0	YD-S140B	Open Command	Bulk Ferric Chloride Storage Tank TK-S140A Inlet Flow Valve Open	WS-P0004						LCP-S11	DO	
0339	0	ZD-S140A	Open Status	Bulk Ferric Chloride Storage Tank TK-S140A Inlet Flow Valve Open	WS-P0004						LCP-S11	DI	

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RECORD NO.	REV. NO.	TAG NAME	DESCRIPTION			P&ID DRAWING	I/O SPECIFICATION							
			FUNCTION	SERVICE	ENG. UNITS		SCALE		ALARMS		PLC CABINET	I/O TYPE	I/O ADDRESS	
							LOW	HIGH	LOW	HIGH				
0340	0	ZB-S140A	Closed Status	Bulk Ferric Chloride Storage Tank TK-S140A Inlet Flow Valve Closed	WS-P0004							LCP-S11	DI	
0341	0	ZD-S140B	Open Status	Bulk Ferric Chloride Storage Tank TK-S140A Inlet Flow Valve Open	WS-P0004							LCP-S11	DI	
0342	0	ZB-S140B	Closed Status	Bulk Ferric Chloride Storage Tank TK-S140A Inlet Flow Valve Closed	WS-P0004							LCP-S11	DI	
0343	0	ZD-S140A	Open Status	Bulk Ferric Chloride Storage Tank TK-S140A Inlet Valve Open	WS-P0004							LCP-S11	DO	
0344	0	ZD-S140B	Open Status	Bulk Ferric Chloride Storage Tank TK-S140A Inlet Valve Open	WS-P0004							LCP-S11	DO	
0345	0	LF-S110A	Level Fault	Bulk Ferric Chloride Storage Tank TK-S110A Level Fault	WS-P0005							LCP-S11	DI	
0346	0	LI-S110B	Level Indicator	Bulk Ferric Chloride Storage Tank TK-S110A Level	WS-P0005							LCP-S11	AI	
0347	0	LI-S110D	Level Indicator	Bulk Ferric Chloride Storage Tank TK-S110A Level	WS-P0005							LCP-S11	AI	
0348	0	YS-S110C	C/O/H Switch in Computer Position	Bulk Ferric Chloride Storage Tank TK-S110A Outlet Flow Valve in Computer Mode	WS-P0005							LCP-S11	DI	
0349	0	YB-S110C	Close Command	Bulk Ferric Chloride Storage Tank TK-S110A Outlet Flow Valve Close	WS-P0005							LCP-S11	DO	
0350	0	YD-S110C	Open Command	Bulk Ferric Chloride Storage Tank TK-S110A Outlet Flow Valve Open	WS-P0005							LCP-S11	DO	
0351	0	ZD-S110C	Open Status	Bulk Ferric Chloride Storage Tank TK-S110A Outlet Flow Valve Open	WS-P0005							LCP-S11	DI	
0352	0	ZB-S110C	Closed Status	Bulk Ferric Chloride Storage Tank TK-S110A Outlet Flow Valve Close	WS-P0005							LCP-S11	DI	
0353	0	LF-S120A	Level Fault	Bulk Ferric Chloride Storage Tank TK-S120A Level Fault	WS-P0005							LCP-S11	DI	
0354	0	LI-S120B	Level Indicator	Bulk Ferric Chloride Storage Tank TK-S120A Level	WS-P0005							LCP-S11	AI	
0355	0	LI-S120D	Level Indicator	Bulk Ferric Chloride Storage Tank TK-S120A Level	WS-P0005							LCP-S11	AI	
0356	0	YS-S120C	C/O/H Switch in Computer Position	Bulk Ferric Chloride Storage Tank TK-S120A Outlet Flow Valve in Computer Mode	WS-P0005							LCP-S11	DI	
0361	0	LA-S190B	Level Alarm	Bulk Ferric Chloride Containment High Level Alarm	WS-P0005							LCP-S11	DI	
0362	0	LA-S190C	Level Alarm	Bulk Ferric Chloride Containment High Level Visual Alarm	WS-P0005							LCP-S11	DO	
0363	0	FA-S757A	Flow Alarm	Emergency Shower Operating EEWS-S757A	WS-P0005							LCP-S11	DI	
0364	0	LF-S130A	Level Fault	Bulk Ferric Chloride Storage Tank TK-S130A Level Fault	WS-P0006							LCP-S11	DI	
0365	0	LI-S130B	Level Indicator	Bulk Ferric Chloride Storage Tank TK-S130A Level	WS-P0006							LCP-S11	AI	
0366	0	LI-S130D	Level Indicator	Bulk Ferric Chloride Storage Tank TK-S130A Level	WS-P0006							LCP-S11	AI	
0367	0	YS-S130C	C/O/H Switch in Computer Position	Bulk Ferric Chloride Storage Tank TK-S130A Outlet Flow Valve in Computer Mode	WS-P0006							LCP-S11	DI	
0368	0	YB-S130C	Close Command	Bulk Ferric Chloride Storage Tank TK-S130A Outlet Flow Valve Close	WS-P0006							LCP-S11	DO	
0369	0	YD-S130C	Open Command	Bulk Ferric Chloride Storage Tank TK-S130A Outlet Flow Valve Open	WS-P0006							LCP-S11	DO	
0370	0	ZD-S130C	Open Status	Bulk Ferric Chloride Storage Tank TK-S130A Outlet Flow Valve Open	WS-P0006							LCP-S11	DI	
0371	0	ZB-S130C	Closed Status	Bulk Ferric Chloride Storage Tank TK-S130A Outlet Flow Valve Close	WS-P0006							LCP-S11	DI	
0372	0	LF-S140A	Level Fault	Bulk Ferric Chloride Storage Tank TK-S140A Level Fault	WS-P0006							LCP-S11	DI	
0373	0	LI-S140B	Level Indicator	Bulk Ferric Chloride Storage Tank TK-S140A Level	WS-P0006							LCP-S11	AI	
0374	0	LI-S140D	Level Indicator	Bulk Ferric Chloride Storage Tank TK-S140A Level	WS-P0006							LCP-S11	AI	
0375	0	YS-S140C	C/O/H Switch in Computer Position	Bulk Ferric Chloride Storage Tank TK-S140A Outlet Flow Valve in Computer Mode	WS-P0006							LCP-S11	DI	
0376	0	YB-S140C	Close Command	Bulk Ferric Chloride Storage Tank TK-S140A Outlet Flow Valve Close	WS-P0006							LCP-S11	DO	
0377	0	YD-S140C	Open Command	Bulk Ferric Chloride Storage Tank TK-S140A Outlet Flow Valve Open	WS-P0006							LCP-S11	DO	

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RECORD NO.	REV. NO.	TAG NAME	DESCRIPTION			I/O SPECIFICATION							
			FUNCTION	SERVICE	P&ID DRAWING	ENG. UNITS	SCALE		ALARMS		PLC CABINET	I/O TYPE	I/O ADDRESS
							LOW	HIGH	LOW	HIGH			
0378	0	ZD-S140C	Open Status	Bulk Ferric Chloride Storage Tank TK-S140A Outlet Flow Valve Open	WS-P0006						LCP-S11	DI	
0379	0	ZB-S140C	Closed Status	Bulk Ferric Chloride Storage Tank TK-S140A Outlet Flow Valve Close	WS-P0006						LCP-S11	DI	
0380	0	MM-S160A	Running Status	Ferric Chloride Feed Pump P-S260A Running	WS-P0007						LCP-S11	DI	
0381	0	MN-S160A	Start Command	Ferric Chloride Feed Pump P-S260A Start	WS-P0007						LCP-S11	DO	
0382	0	SI-S160A	Speed Indication	Ferric Chloride Feed Pump P-S260A Speed	WS-P0007						LCP-S11	AI	
0383	0	SC-S160A	Speed Control Output	Ferric Chloride Feed Pump P-S260A Required Speed	WS-P0007						LCP-S11	AO	
0384	0	UF-S160A	No Fault	Ferric Chloride Feed Pump P-S260A Fault	WS-P0007						LCP-S11	DI	
0385	0	YS-S160A	C/O/H Switch in Computer Position	Ferric Chloride Feed Pump P-S260A in Computer Mode	WS-P0007						LCP-S11	DI	
0386	0	FI-S165A	Flow Indication	Ferric Chloride Feed Pump P-S260A Outlet Flow Rate	WS-P0007						LCP-S11	AI	
0387	0	FQ-S165A	Flow Pulse	Ferric Chloride Feed Pump P-S260A Outlet Flow Total	WS-P0007						LCP-S11	DI	
0388	0	MM-S170A	Running Status	Ferric Chloride Feed Pump P-S270A Running	WS-P0007						LCP-S11	DI	
0389	0	MN-S170A	Start Command	Ferric Chloride Feed Pump P-S270A Start	WS-P0007						LCP-S11	DO	
0390	0	SI-S170A	Speed Indication	Ferric Chloride Feed Pump P-S270A Speed	WS-P0007						LCP-S11	AI	
0391	0	SC-S170A	Speed Control Output	Ferric Chloride Feed Pump P-S270A Required Speed	WS-P0007						LCP-S11	AO	
0392	0	UF-S170A	No Fault	Ferric Chloride Feed Pump P-S270A Fault	WS-P0007						LCP-S11	DI	
0393	0	YS-S170A	C/O/H Switch in Computer Position	Ferric Chloride Feed Pump P-S270A in Computer Mode	WS-P0007						LCP-S11	DI	
0394	0	YD-S170A	Open Command	Standby Ferric Chloride Feed Pump P-S170A Open	WS-P0007						LCP-S11	DO	
0395	0	YB-S170A	Close Command	Standby Ferric Chloride Feed Pump P-S170A Close	WS-P0007						LCP-S11	DO	
0396	0	YS-S170B	C/O/H Switch in Computer Position	Standby Ferric Chloride Feed Pump P-S170A in Computer Mode	WS-P0007						LCP-S11	DI	
0397	0	YD-S170B	Open Command	Standby Ferric Chloride Feed Pump P-S170A Open	WS-P0007						LCP-S11	DO	
0398	0	YB-S170B	Close Command	Standby Ferric Chloride Feed Pump P-S170A Close	WS-P0007						LCP-S11	DO	
0399	0	YS-S170C	C/O/H Switch in Computer Position	Standby Ferric Chloride Feed Pump P-S170A in Computer Mode	WS-P0007						LCP-S11	DI	
0400	0	ZB-S170A	Closed Status	Standby Ferric Chloride Feed Pump P-S170A Outlet Control Valve Closed	WS-P0007						LCP-S11	DI	
0401	0	ZD-S170A	Open Status	Standby Ferric Chloride Feed Pump P-S170A Outlet Control Valve Open	WS-P0007						LCP-S11	DI	
0402	0	ZB-S170B	Closed Status	Standby Ferric Chloride Feed Pump P-S170A Outlet Control Valve Closed	WS-P0007						LCP-S11	DI	
0403	0	ZD-S170B	Open Status	Standby Ferric Chloride Feed Pump P-S170A Outlet Control Valve Open	WS-P0007						LCP-S11	DI	
0404	0	MM-S180A	Running Status	Ferric Chloride Feed Pump P-S280A Running	WS-P0007						LCP-S11	DI	
0405	0	MN-S180A	Start Command	Ferric Chloride Feed Pump P-S280A Start	WS-P0007						LCP-S11	DO	
0406	0	SI-S180A	Speed Indication	Ferric Chloride Feed Pump P-S280A Speed	WS-P0007						LCP-S11	AI	
0407	0	SC-S180A	Speed Control Output	Ferric Chloride Feed Pump P-S280A Required Speed	WS-P0007						LCP-S11	AO	
0408	0	UF-S180A	No Fault	Ferric Chloride Feed Pump P-S280A Fault	WS-P0007						LCP-S11	DI	
0409	0	YS-S180A	C/O/H Switch in Computer Position	Ferric Chloride Feed Pump P-S280A in Computer Mode	WS-P0007						LCP-S11	DI	
0410	0	FI-S185A	Flow Indication	Ferric Chloride Feed Pump P-S280A Outlet Flow Rate	WS-P0007						LCP-S11	AI	
0411	0	FQ-S185A	Flow Pulse	Ferric Chloride Feed Pump P-S280A Outlet Flow Total	WS-P0007						LCP-S11	DI	
0412	0	LA-S190A	Level Alarm	Ferric Chloride Spill Containment High Level	WS-P0007						LCP-S11	DI	
0413	0	HS-S300B	Hand Switch	Select Sodium Hydroxide Storage Tank TK-S310A to Fill	WS-P0008						LCP-S11	DI	
0414	0	HS-S300C	Hand Switch	Select Sodium Hydroxide Storage Tank TK-S320A to Fill	WS-P0008						LCP-S11	DI	
0415	0	HS-S300D	Hand Switch	Select Sodium Hydroxide Storage Tank TK-S330A to Fill	WS-P0008						LCP-S11	DI	

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RECORD NO.	REV. NO.	TAG NAME	DESCRIPTION			I/O SPECIFICATION							
			FUNCTION	SERVICE	P&ID DRAWING	ENG. UNITS	SCALE		ALARMS		PLC CABINET	I/O TYPE	I/O ADDRESS
							LOW	HIGH	LOW	HIGH			
0416	0	HS-S300E	Hand Switch	Select Sodium Hydroxide Storage Tank TK-S340A to Fill	WS-P0008						LCP-S11	DI	
0417	0	HS-S300A	Hand Switch	Selected Sodium Hydroxide Storage Tank Start Fill	WS-P0008						LCP-S11	DI	
0418	0	HS-S300G	Hand Switch	Start Air Purge for Sodium Hydroxide Rail Car	WS-P0008						LCP-S11	DI	
0419	0	YD-S300A	Open Command	Open Fill Valve for Sodium Hydroxide Rail Car	WS-P0008						LCP-S11	DO	
0420	0	YD-S300F	Open Command	Start Steam System for Sodium Hydroxide Rail Car	WS-P0008						LCP-S11	DO	
0421	0	HS-S300H	Hand Switch	Sodium Hydroxide Storage Tank Fill System Stop	WS-P0008						LCP-S11	DO	
0422	0	XM-S301A	Lamp Output	Air Purge Completed for Sodium Hydroxide Rail Car	WS-P0008						LCP-S11	DO	
0423	0	HS-S307B	Hand Switch	Select Sodium Hydroxide Storage Tank TK-S310A to Fill	WS-P0008						LCP-S11	DI	
0424	0	HS-S307C	Hand Switch	Select Sodium Hydroxide Storage Tank TK-S320A to Fill	WS-P0008						LCP-S11	DI	
0425	0	HS-S307D	Hand Switch	Select Sodium Hydroxide Storage Tank TK-S330A to Fill	WS-P0008						LCP-S11	DI	
0426	0	HS-S307E	Hand Switch	Select Sodium Hydroxide Storage Tank TK-S340A to Fill	WS-P0008						LCP-S11	DI	
0427	0	HS-S307A	Hand Switch	Selected Sodium Hydroxide Storage Tank Start Fill	WS-P0008						LCP-S11	DI	
0428	0	HS-S307F	Hand Switch	Start Air Purge for Sodium Hydroxide Truck	WS-P0008						LCP-S11	DI	
0429	0	HS-S307G	Hand Switch	Sodium Hydroxide Storage Tank Fill System Stop	WS-P0008						LCP-S11	DI	
0430	0	XM-S307A	Lamp Output	Air Purge Completed for Sodium Hydroxide Truck	WS-P0008						LCP-S11	DO	
0431	0	YD-S307A	Open Command	Open Fill Valve for Sodium Hydroxide Rail Car	WS-P0008						LCP-S11	DO	
0432	0	LA-S309A	Level Alarm	Sodium Hydroxide Containment Manhole High Level	WS-P0008						LCP-S11	DI	
0433	0	YS-S309A	C/O/H Switch in Computer Position	Sodium Hydroxide Containment Manhole Outlet Flow Valve in Computer Mode	WS-P0008						LCP-S11	DI	
0434	0	YD-S309A	Open Command	Sodium Hydroxide Containment Manhole Outlet Flow Valve Open	WS-P0008						LCP-S11	DO	
0435	0	YB-S309A	Close Command	Sodium Hydroxide Containment Manhole Outlet Flow Valve Close	WS-P0008						LCP-S11	DO	
0436	0	ZD-S309A	Open Status	Sodium Hydroxide Containment Manhole Outlet Flow Valve Open	WS-P0008						LCP-S11	DI	
0437	0	ZB-S309A	Closed Status	Sodium Hydroxide Containment Manhole Outlet Flow Valve Closed	WS-P0008						LCP-S11	DI	
0438	0	LA-S310A	Level Alarm	Sodium Hydroxide Storage Tank TK-S310A High Level	WS-P0008						LCP-S11	DO	
0439	0	LA-S310B	Level Alarm	Sodium Hydroxide Storage Tank TK-S310A High Level	WS-P0008						LCP-S11	DO	
0440	0	YD-S310A	Open Command	Sodium Hydroxide Storage Tank TK-S310A Inlet Flow Valve Open	WS-P0008						LCP-S11	DO	
0441	0	YB-S310B	Close Command	Sodium Hydroxide Storage Tank TK-S310A Inlet Flow Valve Close	WS-P0008						LCP-S11	DO	
0442	0	YD-S310B	Open Command	Sodium Hydroxide Storage Tank TK-S310A Inlet Flow Valve Open	WS-P0008						LCP-S11	DO	
0443	0	ZD-S310A	Open Status	Sodium Hydroxide Storage Tank TK-S310A Inlet Flow Valve Open	WS-P0008						LCP-S11	DI	
0444	0	ZB-S310A	Closed Status	Sodium Hydroxide Storage Tank TK-S310A Inlet Flow Valve Closed	WS-P0008						LCP-S11	DI	
0445	0	ZD-S310B	Open Status	Sodium Hydroxide Storage Tank TK-S310A Inlet Flow Valve Open	WS-P0008						LCP-S11	DI	
0446	0	ZB-S310B	Closed Status	Sodium Hydroxide Storage Tank TK-S310A Inlet Flow Valve Closed	WS-P0008						LCP-S11	DI	
0447	0	ZD-S310A	Open Status	Sodium Hydroxide Storage Tank TK-S310A Inlet Valve Open	WS-P0008						LCP-S11	DO	
0448	0	ZD-S310B	Open Status	Sodium Hydroxide Storage Tank TK-S310A Inlet Valve Open	WS-P0008						LCP-S11	DO	
0449	0	LA-S320A	Level Alarm	Sodium Hydroxide Storage Tank TK-S320A High Level	WS-P0008						LCP-S11	DO	
0450	0	LA-S320B	Level Alarm	Sodium Hydroxide Storage Tank TK-S320A High Level	WS-P0008						LCP-S11	DO	
0451	0	YD-S320A	Open Command	Sodium Hydroxide Storage Tank TK-S320A Inlet Flow Valve Open	WS-P0008						LCP-S11	DO	
0452	0	YB-S320B	Close Command	Sodium Hydroxide Storage Tank TK-S320A Inlet Flow Valve Close	WS-P0008						LCP-S11	DO	

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RECORD NO.	REV. NO.	TAG NAME	DESCRIPTION			P&ID DRAWING	I/O SPECIFICATION						
			FUNCTION	SERVICE	ENG. UNITS		SCALE		ALARMS		PLC CABINET	I/O TYPE	I/O ADDRESS
							LOW	HIGH	LOW	HIGH			
0453	0	YD-S320B	Open Command	Sodium Hydroxide Storage Tank TK-S320A Inlet Flow Valve Open	WS-P0008						LCP-S11	DO	
0454	0	ZD-S320A	Open Status	Sodium Hydroxide Storage Tank TK-S320A Inlet Flow Valve Open	WS-P0008						LCP-S11	DI	
0455	0	ZB-S320A	Closed Status	Sodium Hydroxide Storage Tank TK-S320A Inlet Flow Valve Closed	WS-P0008						LCP-S11	DI	
0456	0	ZD-S320B	Open Status	Sodium Hydroxide Storage Tank TK-S320A Inlet Flow Valve Open	WS-P0008						LCP-S11	DI	
0457	0	ZB-S320B	Closed Status	Sodium Hydroxide Storage Tank TK-S320A Inlet Flow Valve Closed	WS-P0008						LCP-S11	DI	
0458	0	ZD-S320A	Open Status	Sodium Hydroxide Storage Tank TK-S320A Inlet Valve Open	WS-P0008						LCP-S11	DO	
0459	0	ZD-S320B	Open Status	Sodium Hydroxide Storage Tank TK-S320A Inlet Valve Open	WS-P0008						LCP-S11	DO	
0460	0	LA-S330A	Level Alarm	Sodium Hydroxide Storage Tank TK-S330A High Level	WS-P0008						LCP-S11	DO	
0461	0	LA-S330B	Level Alarm	Sodium Hydroxide Storage Tank TK-S330A High Level	WS-P0008						LCP-S11	DO	
0462	0	YD-S330A	Open Command	Sodium Hydroxide Storage Tank TK-S330A Inlet Flow Valve Open	WS-P0008						LCP-S11	DO	
0463	0	YB-S330B	Close Command	Sodium Hydroxide Storage Tank TK-S330A Inlet Flow Valve Close	WS-P0008						LCP-S11	DO	
0464	0	YD-S330B	Open Command	Sodium Hydroxide Storage Tank TK-S330A Inlet Flow Valve Open	WS-P0008						LCP-S11	DO	
0465	0	ZD-S330A	Open Status	Sodium Hydroxide Storage Tank TK-S330A Inlet Flow Valve Open	WS-P0008						LCP-S11	DI	
0466	0	ZB-S330A	Closed Status	Sodium Hydroxide Storage Tank TK-S330A Inlet Flow Valve Closed	WS-P0008						LCP-S11	DI	
0467	0	ZD-S330B	Open Status	Sodium Hydroxide Storage Tank TK-S330A Inlet Flow Valve Open	WS-P0008						LCP-S11	DI	
0468	0	ZB-S330B	Closed Status	Sodium Hydroxide Storage Tank TK-S330A Inlet Flow Valve Closed	WS-P0008						LCP-S11	DI	
0469	0	ZD-S330A	Open Status	Sodium Hydroxide Storage Tank TK-S330A Inlet Valve Open	WS-P0008						LCP-S11	DO	
0470	0	ZD-S330B	Open Status	Sodium Hydroxide Storage Tank TK-S330A Inlet Valve Open	WS-P0008						LCP-S11	DO	
0471	0	LA-S340A	Level Alarm	Sodium Hydroxide Storage Tank TK-S340A High Level	WS-P0008						LCP-S11	DO	
0472	0	LA-S340B	Level Alarm	Sodium Hydroxide Storage Tank TK-S340A High Level	WS-P0008						LCP-S11	DO	
0473	0	YD-S340A	Open Command	Sodium Hydroxide Storage Tank TK-S340A Inlet Flow Valve Open	WS-P0008						LCP-S11	DO	
0474	0	YB-S340B	Close Command	Sodium Hydroxide Storage Tank TK-S340A Inlet Flow Valve Close	WS-P0008						LCP-S11	DO	
0475	0	YD-S340B	Open Command	Sodium Hydroxide Storage Tank TK-S340A Inlet Flow Valve Open	WS-P0008						LCP-S11	DO	
0476	0	ZD-S340A	Open Status	Sodium Hydroxide Storage Tank TK-S340A Inlet Flow Valve Open	WS-P0008						LCP-S11	DI	
0477	0	ZB-S340A	Closed Status	Sodium Hydroxide Storage Tank TK-S340A Inlet Flow Valve Closed	WS-P0008						LCP-S11	DI	
0478	0	ZD-S340B	Open Status	Sodium Hydroxide Storage Tank TK-S340A Inlet Flow Valve Open	WS-P0008						LCP-S11	DI	
0479	0	ZB-S340B	Closed Status	Sodium Hydroxide Storage Tank TK-S340A Inlet Flow Valve Closed	WS-P0008						LCP-S11	DI	
0480	0	ZD-S340A	Open Status	Sodium Hydroxide Storage Tank TK-S340A Inlet Valve Open	WS-P0008						LCP-S11	DO	
0481	0	ZD-S340B	Open Status	Sodium Hydroxide Storage Tank TK-S340A Inlet Valve Open	WS-P0008						LCP-S11	DO	
0482	0	FA-S751A	Flow Alarm	Emergency Shower Operating EEWS-S751A	WS-P0008						LCP-S11	DI	
0483	0	FA-S759A	Flow Alarm	Emergency Shower Operating EEWS-S759A	WS-P0008						LCP-S11	DI	
0484	0	LF-S310A	Level Fault	Bulk Sodium Hydroxide Storage Tank TK-S310A Level Fault	WS-P0009						LCP-S11	DI	
0485	0	LI-S310B	Level Indicator	Bulk Sodium Hydroxide Storage Tank TK-S310A Level	WS-P0009						LCP-S11	AI	
0486	0	LI-S310D	Level Indicator	Bulk Sodium Hydroxide Storage Tank TK-S310A Level	WS-P0009						LCP-S11	AI	
0487	0	TI-S310B	Temperature Indicator	Bulk Sodium Hydroxide Storage Tank TK-S310A Temperature	WS-P0009						LCP-S11	AI	
0488	0	XN-S310A	Heater Control Output	Bulk Sodium Hydroxide Storage Tank TK-S310A Heaters On	WS-P0009						LCP-S11	DO	
0489	0	YS-S310C	C/O/H Switch in Computer Position	Bulk Sodium Hydroxide Storage Tank TK-S310A Outlet Flow Valve in Computer Mode	WS-P0009						LCP-S11	DI	

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			FUNCTION	SERVICE	P&ID DRAWING	ENG. UNITS	SCALE		ALARMS		PLC CABINET	I/O TYPE	I/O ADDRESS
							LOW	HIGH	LOW	HIGH			
0490	0	YB-S310C	Close Command	Bulk Sodium Hydroxide Storage Tank TK-S310A Outlet Flow Valve Close	WS-P0009						LCP-S11	DO	
0491	0	YD-S310C	Open Command	Bulk Sodium Hydroxide Storage Tank TK-S310A Outlet Flow Valve Open	WS-P0009						LCP-S11	DO	
0492	0	ZD-S310C	Open Status	Bulk Sodium Hydroxide Storage Tank TK-S310A Outlet Flow Valve Open	WS-P0009						LCP-S11	DI	
0493	0	ZB-S310C	Closed Status	Bulk Sodium Hydroxide Storage Tank TK-S310A Outlet Flow Valve Close	WS-P0009						LCP-S11	DI	
0494	0	LF-S320A	Level Fault	Bulk Sodium Hydroxide Storage Tank TK-S320A Level Fault	WS-P0009						LCP-S11	DI	
0495	0	LI-S320B	Level Indicator	Bulk Sodium Hydroxide Storage Tank TK-S320A Level	WS-P0009						LCP-S11	AI	
0496	0	TI-S320B	Temperature Indicator	Bulk Sodium Hydroxide Storage Tank TK-S320A Temperature	WS-P0009						LCP-S11	AI	
0497	0	XN-S320A	Heater Control Output	Bulk Sodium Hydroxide Storage Tank TK-S320A Heaters On	WS-P0009						LCP-S11	DO	
0498	0	YS-S320C	C/O/H Switch in Computer Position	Bulk Sodium Hydroxide Storage Tank TK-S320A Outlet Flow Valve in Computer Mode	WS-P0009						LCP-S11	DI	
0499	0	YB-S320C	Close Command	Bulk Sodium Hydroxide Storage Tank TK-S320A Outlet Flow Valve Close	WS-P0009						LCP-S11	DO	
0500	0	YD-S320C	Open Command	Bulk Sodium Hydroxide Storage Tank TK-S320A Outlet Flow Valve Open	WS-P0009						LCP-S11	DO	
0501	0	ZD-S320C	Open Status	Bulk Sodium Hydroxide Storage Tank TK-S320A Outlet Flow Valve Open	WS-P0009						LCP-S11	DI	
0502	0	ZB-S320C	Closed Status	Bulk Sodium Hydroxide Storage Tank TK-S320A Outlet Flow Valve Close	WS-P0009						LCP-S11	DI	
0503	0	LA-S371B	Level Alarm	Sodium Hydroxide Containment North Sump Level High	WS-P0009						LCP-S11	DI	
0504	0	LA-S371C	Level Alarm	Sodium Hydroxide Containment Visual Level High Alarm	WS-P0009						LCP-S11	DO	
0505	0	FA-S754A	Flow Alarm	Emergency Shower Operating EEWS-S754A	WS-P0009						LCP-S11	DI	
0506	0	LF-S330A	Level Fault	Bulk Sodium Hydroxide Storage Tank TK-S330A Level Fault	WS-P0010						LCP-S11	DI	
0507	0	LI-S330B	Level Indicator	Bulk Sodium Hydroxide Storage Tank TK-S330A Level	WS-P0010						LCP-S11	AI	
0508	0	LI-S330D	Level Indicator	Bulk Sodium Hydroxide Storage Tank TK-S330A Level	WS-P0010						LCP-S11	AI	
0509	0	TI-S330B	Temperature Indicator	Bulk Sodium Hydroxide Storage Tank TK-S330A Temperature	WS-P0010						LCP-S11	AI	
0510	0	XN-S330A	Heater Control Output	Bulk Sodium Hydroxide Storage Tank TK-S330A Heaters On	WS-P0010						LCP-S11	DO	
0511	0	YS-S330C	C/O/H Switch in Computer Position	Bulk Sodium Hydroxide Storage Tank TK-S330A Outlet Flow Valve in Computer Mode	WS-P0010						LCP-S11	DI	
0512	0	YB-S330C	Close Command	Bulk Sodium Hydroxide Storage Tank TK-S330A Outlet Flow Valve Close	WS-P0010						LCP-S11	DO	
0513	0	YD-S330C	Open Command	Bulk Sodium Hydroxide Storage Tank TK-S330A Outlet Flow Valve Open	WS-P0010						LCP-S11	DO	
0514	0	ZD-S330C	Open Status	Bulk Sodium Hydroxide Storage Tank TK-S330A Outlet Flow Valve Open	WS-P0010						LCP-S11	DI	
0515	0	ZB-S330C	Closed Status	Bulk Sodium Hydroxide Storage Tank TK-S330A Outlet Flow Valve Close	WS-P0010						LCP-S11	DI	
0516	0	LF-S340A	Level Fault	Bulk Sodium Hydroxide Storage Tank TK-S340A Level Fault	WS-P0010						LCP-S11	DI	
0517	0	LI-S340B	Level Indicator	Bulk Sodium Hydroxide Storage Tank TK-S340A Level	WS-P0010						LCP-S11	AI	
0518	0	LI-S340D	Level Indicator	Bulk Sodium Hydroxide Storage Tank TK-S340A Leve	WS-P0010						LCP-S11	AI	
0519	0	TI-S340B	Temperature Indicator	Bulk Sodium Hydroxide Storage Tank TK-S340A Temperature	WS-P0010						LCP-S11	AI	
0520	0	XN-S340A	Heater Control Output	Bulk Sodium Hydroxide Storage Tank TK-S340A Heaters On	WS-P0010						LCP-S11	DO	
0521	0	YS-S340C	C/O/H Switch in Computer Position	Bulk Sodium Hydroxide Storage Tank TK-S340A Outlet Flow Valve in Computer Mode	WS-P0010						LCP-S11	DI	
0522	0	YB-S340C	Close Command	Bulk Sodium Hydroxide Storage Tank TK-S340A Outlet Flow Valve Close	WS-P0010						LCP-S11	DO	
0523	0	YD-S340C	Open Command	Bulk Sodium Hydroxide Storage Tank TK-S340A Outlet Flow Valve Open	WS-P0010						LCP-S11	DO	
0524	0	ZD-S340C	Open Status	Bulk Sodium Hydroxide Storage Tank TK-S340A Outlet Flow Valve Open	WS-P0010						LCP-S11	DI	

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RECORD NO.	REV. NO.	TAG NAME	DESCRIPTION			I/O SPECIFICATION							
			FUNCTION	SERVICE	P&ID DRAWING	ENG. UNITS	SCALE		ALARMS		PLC CABINET	I/O TYPE	I/O ADDRESS
							LOW	HIGH	LOW	HIGH			
0525	0	ZB-S340C	Closed Status	Bulk Sodium Hydroxide Storage Tank TK-S340A Outlet Flow Valve Close	WS-P0010						LCP-S11	DI	
0526	0	FI-S350A	Flow Indication	Sodium Hydroxide Feed Pump P-S350A Outlet Flow Rate	WS-P0011						LCP-S11	AI	
0527	0	FQ-S350A	Flow Pulse	Sodium Hydroxide Feed Pump P-S350A Outlet Flow Total	WS-P0011						LCP-S11	DI	
0528	0	MM-S350A	Running Status	Sodium Hydroxide Feed Pump P-S350A Running	WS-P0011						LCP-S11	DI	
0529	0	MN-S350A	Start Command	Sodium Hydroxide Feed Pump P-S350A Start	WS-P0011						LCP-S11	DO	
0530	0	SI-S350A	Speed Indication	Sodium Hydroxide Feed Pump P-S350A Speed	WS-P0011						LCP-S11	AI	
0531	0	SC-S350A	Speed Control Output	Sodium Hydroxide Feed Pump P-S350A Required Speed	WS-P0011						LCP-S11	AO	
0532	0	UF-S350A	No Fault	Sodium Hydroxide Feed Pump P-S350A Fault	WS-P0011						LCP-S11	DI	
0533	0	YS-S350A	C/O/H Switch in Computer Position	Sodium Hydroxide Feed Pump P-S350A in Computer Mode	WS-P0011						LCP-S11	DI	
0534	0	YS-S350B	C/O/H Switch in Computer Position	Sodium Hydroxide Feed Pump P-S350A Outlet Control Valve in Computer Mode	WS-P0011						LCP-S11	DI	
0535	0	YB-S350A	Close Command	Sodium Hydroxide Feed Pump P-S350A Outlet Control Valve Close	WS-P0011						LCP-S11	DO	
0536	0	YD-S350A	Open Command	Sodium Hydroxide Feed Pump P-S350A Outlet Control Valve Open	WS-P0011						LCP-S11	DO	
0537	0	ZB-S350A	Closed Status	Sodium Hydroxide Feed Pump P-S350A Outlet Control Valve Closed	WS-P0011						LCP-S11	DI	
0538	0	ZD-S350A	Open Status	Sodium Hydroxide Feed Pump P-S350A Outlet Control Valve Open	WS-P0011						LCP-S11	DI	
0539	0	MM-S360A	Running Status	Sodium Hydroxide Feed Pump P-S360A Running	WS-P0011						LCP-S11	DI	
0540	0	MN-S360A	Start Command	Sodium Hydroxide Feed Pump P-S360A Start	WS-P0011						LCP-S11	DO	
0541	0	SI-S360A	Speed Indication	Sodium Hydroxide Feed Pump P-S360A Speed	WS-P0011						LCP-S11	AI	
0542	0	SC-S360A	Speed Control Output	Sodium Hydroxide Feed Pump P-S360A Required Speed	WS-P0011						LCP-S11	AO	
0543	0	UF-S360A	No Fault	Sodium Hydroxide Feed Pump P-S360A Fault	WS-P0011						LCP-S11	DI	
0544	0	YS-S360A	C/O/H Switch in Computer Position	Sodium Hydroxide Feed Pump P-S360A in Computer Mode	WS-P0011						LCP-S11	DI	
0545	0	YS-S360B	C/O/H Switch in Computer Position	Standby Sodium Hydroxide Feed Pump P-S360A Outlet Control Valve in Computer Mode	WS-P0011						LCP-S11	DI	
0546	0	YB-S360A	Close Command	Standby Sodium Hydroxide Feed Pump P-S360A Outlet Control Valve Close	WS-P0011						LCP-S11	DO	
0547	0	YD-S360A	Open Command	Standby Sodium Hydroxide Feed Pump P-S360A Outlet Control Valve Open	WS-P0011						LCP-S11	DO	
0548	0	ZB-S360A	Closed Status	Standby Sodium Hydroxide Feed Pump P-S360A Outlet Control Valve Closed	WS-P0011						LCP-S11	DI	
0549	0	ZD-S360A	Open Status	Standby Sodium Hydroxide Feed Pump P-S360A Outlet Control Valve Open	WS-P0011						LCP-S11	DI	
0550	0	FI-S370A	Flow Indication	Sodium Hydroxide Feed Pump P-S370A Outlet Flow Rate	WS-P0011						LCP-S11	AI	
0551	0	FQ-S370A	Flow Pulse	Sodium Hydroxide Feed Pump P-S370A Outlet Flow Total	WS-P0011						LCP-S11	DI	
0552	0	MM-S370A	Running Status	Sodium Hydroxide Feed Pump P-S370A Running	WS-P0011						LCP-S11	DI	
0553	0	MN-S370A	Start Command	Sodium Hydroxide Feed Pump P-S370A Start	WS-P0011						LCP-S11	DO	
0554	0	SI-S370A	Speed Indication	Sodium Hydroxide Feed Pump P-S370A Speed	WS-P0011						LCP-S11	AI	
0555	0	SC-S370A	Speed Control Output	Sodium Hydroxide Feed Pump P-S370A Required Speed	WS-P0011						LCP-S11	AO	
0556	0	UF-S370A	No Fault	Sodium Hydroxide Feed Pump P-S370A Fault	WS-P0011						LCP-S11	DI	
0557	0	YS-S370A	C/O/H Switch in Computer Position	Sodium Hydroxide Feed Pump P-S370A in Computer Mode	WS-P0011						LCP-S11	DI	
0558	0	YS-S370B	C/O/H Switch in Computer Position	Sodium Hydroxide Feed Pump P-S370A Outlet Control Valve in Computer Mode	WS-P0011						LCP-S11	DI	
0559	0	YB-S370A	Close Command	Sodium Hydroxide Feed Pump P-S370A Outlet Control Valve Close	WS-P0011						LCP-S11	DO	

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RECORD NO.	REV. NO.	TAG NAME	DESCRIPTION			I/O SPECIFICATION							
			FUNCTION	SERVICE	P&ID DRAWING	ENG. UNITS	SCALE		ALARMS		PLC CABINET	I/O TYPE	I/O ADDRESS
							LOW	HIGH	LOW	HIGH			
0560	0	YD-S370A	Open Command	Sodium Hydroxide Feed Pump P-S370A Outlet Control Valve Open	WS-P0011						LCP-S11	DO	
0561	0	ZB-S370A	Closed Status	Sodium Hydroxide Feed Pump P-S370A Outlet Control Valve Closed	WS-P0011						LCP-S11	DI	
0562	0	ZD-S370A	Open Status	Sodium Hydroxide Feed Pump P-S370A Outlet Control Valve Open	WS-P0011						LCP-S11	DI	
0563	0	LA-S371A	Level Alarm	Sodium Hydroxide Spill Containment South Sump High Level	WS-P0011						LCP-S11	DI	
0564	0	LA-S400A	Level Alarm	Bulk Ammonia Containment Manhole High Level	WS-P0012						LCP-S11	DI	
0565	0	YS-S400A	C/O/H Switch in Computer Position	Bulk Ammonia Containment Manhole Outlet Flow Valve in Computer Mode	WS-P0012						LCP-S11	DI	
0566	0	YB-S400A	Close Command	Bulk Ammonia Containment Manhole Outlet Flow Valve Close	WS-P0012						LCP-S11	DO	
0567	0	YD-S400A	Open Command	Bulk Ammonia Containment Manhole Outlet Flow Valve Open	WS-P0012						LCP-S11	DO	
0568	0	ZD-S400A	Open Status	Bulk Ammonia Containment Manhole Outlet Flow Valve Open	WS-P0012						LCP-S11	DI	
0569	0	ZB-S400A	Closed Status	Bulk Ammonia Containment Manhole Outlet Flow Valve Closed	WS-P0012						LCP-S11	DI	
0570	0	HS-S401A	Hand Switch	Bulk Ammonia Storage Tank TK-S410A or TK-S420A Start Fill From Truck	WS-P0012						LCP-S11	DI	
0571	0	HS-S401B	Hand Switch	Start Air Purge for Bulk Ammonia Truck	WS-P0012						LCP-S11	DI	
0572	0	HS-S401C	Hand Switch	Bulk Ammonia Tank Fill System Stop	WS-P0012						LCP-S11	DI	
0573	0	YD-S401A	Close Command	Open Fill Valve SOL-S401A	WS-P0012						LCP-S11	DO	
0574	0	HS-S410A	Hand Switch	Bulk Ammonia Storage Tank TK-S410A Select Tank to Fill Truck	WS-P0012						LCP-S11	DI	
0575	0	LA-S410A	Level Alarm	Bulk Ammonia Storage Tank TK-S410A High Level	WS-P0012						LCP-S11	DO	
0576	0	XM-S410A	Lamp Output	Air Purge Completed for Bulk Ammonia Truck	WS-P0012						LCP-S11	DO	
0577	0	YB-S410A	Close Command	Bulk Ammonia Storage Tank TK-S410A Inlet Flow Valve Close	WS-P0012						LCP-S11	DO	
0578	0	YD-S410A	Open Command	Bulk Ammonia Storage Tank TK-S410A Inlet Flow Valve Open	WS-P0012						LCP-S11	DO	
0579	0	ZD-S410A	Open Status	Bulk Ammonia Storage Tank TK-S410A Inlet Flow Valve Open	WS-P0012						LCP-S11	DI	
0580	0	ZB-S410A	Closed Status	Bulk Ammonia Storage Tank TK-S410A Inlet Flow Valve Closed	WS-P0012						LCP-S11	DI	
0581	0	ZD-S410A	Open Status	Bulk Ammonia Storage Tank TK-S410A Inlet Valve Open	WS-P0012						LCP-S11	DO	
0582	0	HS-S420A	Hand Switch	Bulk Ammonia Storage Tank TK-S420A Select Tank to Fill Truck	WS-P0012						LCP-S11	DI	
0583	0	LA-S420A	Level Alarm	Bulk Ammonia Storage Tank TK-S420A High Level	WS-P0012						LCP-S11	DO	
0584	0	YB-S420A	Close Command	Bulk Ammonia Storage Tank TK-S420A Inlet Flow Valve Close	WS-P0012						LCP-S11	DO	
0585	0	YD-S420A	Open Command	Bulk Ammonia Storage Tank TK-S420A Inlet Flow Valve Open	WS-P0012						LCP-S11	DO	
0586	0	ZD-S420A	Open Status	Bulk Ammonia Storage Tank TK-S420A Inlet Flow Valve Open	WS-P0012						LCP-S11	DI	
0587	0	ZB-S420A	Closed Status	Bulk Ammonia Storage Tank TK-S420A Inlet Flow Valve Closed	WS-P0012						LCP-S11	DI	
0588	0	ZD-S420A	Open Status	Bulk Ammonia Storage Tank TK-S420A Inlet Valve Open	WS-P0012						LCP-S11	DO	
0589	0	FA-S752A	Flow Alarm	Emergency Shower Operating EEWS-S752A	WS-P0012						LCP-S11	DI	
0590	0	LA-S405A	Level Alarm	Bulk Ammonia Storage Tank TK-S410A Water Column Water Level Low	WS-P0013						LCP-S11	DI	
0591	0	LA-S405B	Level Alarm	Bulk Ammonia Storage Tank TK-S420A Water Column Water Level Low	WS-P0013						LCP-S11	DI	S
0592	0	LA-S405C	Level Alarm	Bulk Ammonia Containment Level High or Gas Visual Alarm	WS-P0013						LCP-S11	DI	
0593	0	YD-S405A	Open Command	Bulk Ammonia Storage Tank TK-S410A Solenoid Valve Open	WS-P0013						LCP-S11	DO	
0594	0	YD-S405B	Open Command	Bulk Ammonia Storage Tank TK-S420A Solenoid Valve Open	WS-P0013						LCP-S11	DO	
0595	0	LI-S410A	Level Indicator	Bulk Ammonia Storage Tank TK-S410A Level	WS-P0013						LCP-S11	AI	
0596	0	LI-S410B	Level Indicator	Bulk Ammonia Storage Tank TK-S410A Level	WS-P0013						LCP-S11	AI	
0597	0	PA-S410A	Pressure Alarm	Bulk Ammonia Storage Tank TK-S410A Relief Valve Operating	WS-P0013						LCP-S11	DI	

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			FUNCTION	SERVICE	P&ID DRAWING	ENG. UNITS	SCALE		ALARMS		PLC CABINET	I/O TYPE	I/O ADDRESS
							LOW	HIGH	LOW	HIGH			
0598	0	UF-S410A	Level Fault	Bulk Ammonia Storage Tank TK-S410A Level	WS-P0013						LCP-S11	DI	
0599	0	UF-S410B	Level Fault	Bulk Ammonia Storage Tank TK-S410A Level	WS-P0013						LCP-S11	DI	
0600	0	YB-S410B	Close Command	Bulk Ammonia Storage Tank TK-S410A Vacuum/Pressure Relief Valve Close	WS-P0013						LCP-S11	DO	
0601	0	YD-S410B	Open Command	Bulk Ammonia Storage Tank TK-S410A Vacuum/Pressure Relief Valve Open	WS-P0013						LCP-S11	DO	
0602	0	YS-S410C	C/O/H Switch in Computer Position	Bulk Ammonia Storage Tank TK-S410A in Computer Mode	WS-P0013						LCP-S11	DI	
0603	0	YB-S410C	Close Command	Bulk Ammonia Storage Tank TK-S410A Outlet Flow Valve Close	WS-P0013						LCP-S11	DO	
0604	0	YD-S410C	Open Command	Bulk Ammonia Storage Tank TK-S410A Outlet Flow Valve Open	WS-P0013						LCP-S11	DO	
0605	0	ZD-S410B	Open Status	Bulk Ammonia Storage Tank TK-S410A Vacuum/Pressure Relief Valve Open	WS-P0013						LCP-S11	DI	
0606	0	ZB-S410B	Closed Status	Bulk Ammonia Storage Tank TK-S410A Vacuum/Pressure Relief Valve Closed	WS-P0013						LCP-S11	DI	
0607	0	ZD-S410C	Open Status	Bulk Ammonia Storage Tank TK-S410A Outlet Flow Valve Open	WS-P0013						LCP-S11	DI	
0608	0	ZB-S410C	Closed Status	Bulk Ammonia Storage Tank TK-S410A Outlet Flow Valve Closed	WS-P0013						LCP-S11	DI	
0609	0	LI-S420A	Level Indicator	Bulk Ammonia Storage Tank TK-S420A Level	WS-P0013						LCP-S11	AI	
0610	0	LI-S420B	Level Indicator	Bulk Ammonia Storage Tank TK-S420A Level	WS-P0013						LCP-S11	AI	
0611	0	PA-S420A	Pressure Alarm	Bulk Ammonia Storage Tank TK-S420A Relief Valve Operating	WS-P0013						LCP-S11	DI	
0612	0	UF-S420A	Level Fault	Bulk Ammonia Storage Tank TK-S420A Level	WS-P0013						LCP-S11	DI	
0613	0	UF-S420B	Level Fault	Bulk Ammonia Storage Tank TK-S420A Level	WS-P0013						LCP-S11	DI	
0614	0	YB-S420B	Close Command	Bulk Ammonia Storage Tank TK-S420A Vacuum/Pressure Relief Valve Close	WS-P0013						LCP-S11	DO	
0615	0	YD-S420B	Open Command	Bulk Ammonia Storage Tank TK-S420A Vacuum/Pressure Relief Valve Open	WS-P0013						LCP-S11	DO	
0616	0	YS-S420C	C/O/H Switch in Computer Position	Bulk Ammonia Storage Tank TK-S420A Outlet Flow Valve in Computer Mode	WS-P0013						LCP-S11	DI	
0617	0	YB-S420C	Close Command	Bulk Ammonia Storage Tank TK-S420A Outlet Flow Valve Close	WS-P0013						LCP-S11	DO	
0618	0	YD-S420C	Open Command	Bulk Ammonia Storage Tank TK-S420A Outlet Flow Valve Open	WS-P0013						LCP-S11	DO	
0619	0	ZD-S420B	Open Status	Bulk Ammonia Storage Tank TK-S420A Vacuum/Pressure Relief Valve Open	WS-P0013						LCP-S11	DI	
0620	0	ZB-S420B	Closed Status	Bulk Ammonia Storage Tank TK-S420A Vacuum/Pressure Relief Valve Closed	WS-P0013						LCP-S11	DI	
0621	0	ZD-S420C	Open Status	Bulk Ammonia Storage Tank TK-S420A Outlet Flow Valve Open	WS-P0013						LCP-S11	DI	
0622	0	ZB-S420C	Closed Status	Bulk Ammonia Storage Tank TK-S420A Outlet Flow Valve Closed	WS-P0013						LCP-S11	DI	
0623	0	GI-S450B	Gas Indicator	Bulk Ammonia Gas Indicator	WS-P0013						LCP-S11	DI	
0624	0	FI-S430A	Flow Indication	Ammonia Feed Pump P-S430A Outlet Flow Rate	WS-P0014						LCP-S11	AI	
0625	0	FQ-S430A	Flow Pulse	Ammonia Feed Pump P-S430A Outlet Flow Total	WS-P0014						LCP-S11	DI	
0626	0	MM-S430A	Running Status	Ammonia Feed Pump P-S430A Running	WS-P0014						LCP-S11	DI	
0627	0	MN-S430A	Start Command	Ammonia Feed Pump P-S430A Start	WS-P0014						LCP-S11	DO	
0628	0	SI-S430A	Speed Indication	Ammonia Feed Pump P-S430A Speed	WS-P0014						LCP-S11	AI	
0629	0	SC-S430A	Speed Control Output	Ammonia Feed Pump P-S430A Required Speed	WS-P0014						LCP-S11	AO	
0630	0	UF-S430A	No Fault	Ammonia Feed Pump P-S430A Fault	WS-P0014						LCP-S11	DI	
0631	0	YS-S430A	C/O/H Switch in Computer Position	Ammonia Feed Pump P-S430A in Computer Mode	WS-P0014						LCP-S11	DI	
0632	0	FI-S440A	Flow Indication	Ammonia Feed Pump P-S440A Outlet Flow Rate	WS-P0014						LCP-S11	AI	
0633	0	FQ-S440A	Flow Pulse	Ammonia Feed Pump P-S440A Outlet Flow Total	WS-P0014						LCP-S11	DI	

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			FUNCTION	SERVICE	P&ID DRAWING	ENG. UNITS	SCALE		ALARMS		PLC CABINET	I/O TYPE	I/O ADDRESS
							LOW	HIGH	LOW	HIGH			
0634	0	MM-S440A	Running Status	Ammonia Feed Pump P-S440A Running	WS-P0014						LCP-S11	DI	
0635	0	MN-S440A	Start Command	Ammonia Feed Pump P-S440A Start	WS-P0014						LCP-S11	DO	
0636	0	SI-S440A	Speed Indication	Ammonia Feed Pump P-S440A Speed	WS-P0014						LCP-S11	AI	
0637	0	SC-S440A	Speed Control Output	Ammonia Feed Pump P-S440A Required Speed	WS-P0014						LCP-S11	AO	
0638	0	UF-S440A	No Fault	Ammonia Feed Pump P-S440A Fault	WS-P0014						LCP-S11	DI	
0639	0	YS-S440A	C/O/H Switch in Computer Position	Ammonia Feed Pump P-S440A in Computer Mode	WS-P0014						LCP-S11	DI	
0640	0	YS-S440A	C/O/H Switch in Computer Position	Ammonia Feed Pump Outlet Control Valve in Computer Mode	WS-P0014						LCP-S11	DI	
0641	0	YB-S440A	Close Command	Ammonia Feed Pump Outlet Control Valve Close	WS-P0014						LCP-S11	DO	
0642	0	YD-S440A	Open Command	Ammonia Feed Pump Outlet Control Valve Open	WS-P0014						LCP-S11	DO	
0643	0	ZB-S440A	Closed Status	Ammonia Feed Pump Outlet Control Valve Closed	WS-P0014						LCP-S11	DI	
0644	0	ZD-S440A	Open Status	Ammonia Feed Pump Outlet Control Valve Open	WS-P0014						LCP-S11	DI	
0645	0	LA-S450A	Level Alarm	Ammonia Spill Containment High Level	WS-P0014						LCP-S11	DI	
0646	0	UF-H805A	No Fault	Hot Water Boiler BG-H805A Fault	WS-H0508						LCP-S11	DI	
0647	0	UF-H805B	No Fault	Hot Water Boiler BG-H805B Fault	WS-H0508						LCP-S11	DI	
0648	0	UF-H808A	No Fault	Glycol Recirc Pump GP-H808A Fault	WS-H0508						LCP-S11	DI	
0649	0	UF-H808B	No Fault	Glycol Recirc Pump GP-H808B Fault	WS-H0508						LCP-S11	DI	
0650	0	UF-H810A	No Fault	West Hydronic Glycol Pump GP-H810A Fault	WS-H0509						LCP-S11	DI	
0651	0	UF-H810B	No Fault	West Hydronic Glycol Pump GP-H810B Fault	WS-H0509						LCP-S11	DI	
0652	0	UF-H812A	No Fault	Hypo Building Glycol Pump GP-H812A Fault	WS-H0511						LCP-S11	DI	
0653	0	UF-H812B	No Fault	Hypo Building Glycol Pump GP-H812B Fault	WS-H0511						LCP-S11	DI	
0654	0	UF-H800A	No Fault	Make Up Air Unit MAU-H800A Fault	WS-H0513						LCP-S11	DI	
0655	0	TI-H800F	Temperature Indication	Ferric Chloride Room Temperature	WS-H0513						LCP-S11	AI	
0656	0	MN-H825A	Start Command	Emergency Exhaust Fan EF-H825C Start	WS-H0513						LCP-S11	DO	
0657	0	UF-H801A	No Fault	Make Up Air Unit MAU-H801A Fault	WS-H0514						LCP-S11	DI	
0658	0	TI-H801F	Temperature Indication	Sulphuric Acid Room Temperature	WS-H0514						LCP-S11	AI	
0659	0	MN-H824A	Start Command	Emergency Exhaust Fan EF-H824C Start	WS-H0514						LCP-S11	DO	
0660	0	UF-H802A	No Fault	Make Up Air Unit MAU-H802A Fault	WS-H0515						LCP-S11	DI	
0661	0	TI-H802F	Temperature Indication	Sodium Hydroxide Room Temperature	WS-H0515						LCP-S11	AI	
0662	0	MN-H821A	Start Command	Emergency Exhaust Fan EF-H821C Start	WS-H0515						LCP-S11	DO	
0663	0	UF-H804A	No Fault	Make Up Air Unit MAU-H802A Fault	WS-H0516						LCP-S11	DI	
0664	0	TI-H804F	Temperature Indication	Aqua Ammonia Room Temperature	WS-H0516						LCP-S11	AI	
0665	0	MN-H820A	Start Command	Emergency Exhaust Fan EF-H820C Start	WS-H0516						LCP-S11	DO	
0666	0	UF-H803A	No Fault	Air Handling Unit AHU-H803A Fault	WS-H0517						LCP-S11	DI	
0667	0	TI-H803A	Temperature Indication	Electrical Room Temperature	WS-H0517						LCP-S11	AI	
0668	0	UF-H828A	No Fault	Air Handling Unit AHU-H803A Fault	WS-H0518						LCP-S11	DI	
0669	0	TI-H828A	Temperature Indication	Electrical Room Temperature	WS-H0518						LCP-S11	AI	
0670	0	UF-H000A	No Fault	Common Trace Heating Fault	WS-H0520						LCP-S11	DI	
0671	0	UF-S701A	Water Hardness Fault	Softened Water Hardness Monitor	WS-H0502						LCP-S11	DI	

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			FUNCTION	SERVICE	P&ID DRAWING	ENG. UNITS	SCALE		ALARMS		PLC CABINET	I/O TYPE	I/O ADDRESS
							LOW	HIGH	LOW	HIGH			
0672	0	AI-S701A	Water Hardness Indication	Softened Water Hardness Monitor	WS-H0502						LCP-S11	AI	
0673	0	WI-S702A	Weight Indicator	Amine Drum Weight	WS-H0502						LCP-S11	AI	
0674	0	LA-S703A	Level Alarm	Condensate Tank TNK-S703A Low Level	WS-H0502						LCP-S11	DI	
0675	0	MN-S707A	Start Command	Standby Boiler Feedwater Pump P-S707A Start	WS-H0503						LCP-S11	DO	
0676	0	YS-S707A	C/O/H Switch in Computer Position	Standby Boiler Feedwater Pump P-S707A in Computer Mode	WS-H0503						LCP-S11	DI	
0677	0	MM-S707A	Running Status	Standby Boiler Feedwater Pump P-S707A Running	WS-H0503						LCP-S11	DI	
0678	0	UF-S707A	No Fault	Standby Boiler Feedwater Pump P-S707A Fault	WS-H0503						LCP-S11	DI	
0679	0	MN-S706A	Start Command	Boiler Feedwater Pump P-S706A Start	WS-H0503						LCP-S11	DO	
0680	0	YS-S706A	C/O/H Switch in Computer Position	Boiler Feedwater Pump P-S706A in Computer Mode	WS-H0503						LCP-S11	DI	
0681	0	MM-S706A	Running Status	Boiler Feedwater Pump P-S706A Running	WS-H0503						LCP-S11	DI	
0682	0	UF-S706A	No Fault	Boiler Feedwater Pump P-S706A Fault	WS-H0503						LCP-S11	DI	
0683	0	YD-S708A	Open Command	Boiler Water Supply Solenoid Valve SOL-S708A Open	WS-H0503						LCP-S11	DI	
0684	0	XN-S704A	Boiler Start Command	Steam Boiler BLR-S704A Start	WS-H0503						LCP-S11	DO	
0685	0	XU-S704A	Boiler Fault	Steam Boiler BLR-S704A Fault	WS-H0503						LCP-S11	DI	
0686	0	LA-S705A	Level Alarm	Steam Boiler BLR-S704A Low Level	WS-H0503						LCP-S11	DI	
0687	0	YD-S708B	Open Command	Boiler Water Supply Solenoid Valve SOL-S708B Open	WS-H0503						LCP-S11	DI	
0688	0	LA-S705A	Level Alarm	Steam Boiler BLR-S705A Low Level	WS-H0503						LCP-S11	DI	
0689	0	XN-S705A	Boiler Start Command	Steam Boiler BLR-S705A Start	WS-H0503						LCP-S11	DO	
0690	0	XU-S705A	Boiler Fault	Steam Boiler BLR-S705A Fault	WS-H0503						LCP-S11	DI	
0691	0	PA-S709A	Pressure Alarm	Steam Heater Pressure Low	WS-H0503						LCP-S11	DI	
0692	0	MN-S816A	Start Command	Air Compressor CMP-S816A Start	WS-H0521						LCP-S11	DO	
0693	0	MM-S816A	Running Status	Air Compressor CMP-S816A Running	WS-H0521						LCP-S11	DI	
0694	0	YS-S816A	C/O/H Switch in Computer Position	Air Compressor CMP-S816A in Computer Mode	WS-H0521						LCP-S11	DI	
0695	0	UF-S816A	No Fault	Air Compressor CMP-S816A Fault	WS-H0521						LCP-S11	DI	
0696	0	MN-S815A	Start Command	Air Compressor CMP-S815A Start	WS-H0521						LCP-S11	DO	
0697	0	MM-S815A	Running Status	Air Compressor CMP-S815A Running	WS-H0521						LCP-S11	DI	
0698	0	YS-S815A	C/O/H Switch in Computer Position	Air Compressor CMP-S815A in Computer Mode	WS-H0521						LCP-S11	DI	
0699	0	UF-S815A	No Fault	Air Compressor CMP-S815A Fault	WS-H0521						LCP-S11	DI	
0700	0	UF-S350A	No Fault	Sodium Hydroxide Dosing Line Trace Heating Fault	WS-P0011						LCP-S11	DI	
0701	0	UF-S370A	No Fault	Sodium Hydroxide Dosing Line Trace Heating Fault	WS-P0012						LCP-S11	DI	
0702	0	XX-xxx	HVAC Load Shedding	Standby Power Mode load shedding signal to HVAC/ BMS							LCP-S11	DO	



**INSTRUMENT INDEX**

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**1. GENERAL**

**1.1 References - General**

.1 Refer to Section 17010 – Instrumentation and Control General Requirements.

**1.2 Instrument Index**

.1 The following spreadsheet gives an itemized list of the instrumentation included as part of this Work.

**2. PRODUCTS (NOT USED)**

**3. EXECUTION (NOT USED)**

**END OF SECTION**

INSTRUMENT INDEX

RECORD NO.	REV. No.	TAG NAME	DESCRIPTION		MANUFACTURER	MODEL	POWER SUPPLY	CALIBRATED RANGE	MOUNTING	SUPPLIED BY	INSTALLED BY	COMMENTS	SPEC. DATA SHEET	P&ID DRAWING	INSTRUMENT LOOP DIA.	INSTALL-ATION DETAIL	LOCATION DWG.
			INSTRUMENT TYPE	SERVICE													
0001	0	FE-J001A	Flow Element	Softened Water Flow to Salt Saturators and Electrolysers	ABB	Magmaster		-25 to +130°C	Flange	Supply Contractor	Contractor	50 mm	Refer to shop drawings	CPG0465-I-01 Sheet 4	WB-A0453	WB-A0453	CPG0465-ML-01 Sheet 1
0002	0	FT-J001A	Flow Transmitter	Softened Water Flow to Salt Saturators and Electrolysers	ABB	Magmaster	120V	-25 to +130°C	Wall/Stand	Supply Contractor	Contractor		Refer to shop drawings	CPG0465-I-01 Sheet 4	WB-A0453	WB-A0402	CPG0465-ML-01 Sheet 1
0003	0	AE-J001B	Analyser Element	Softened Water Hardness Monitor	Hach	SP-510	120V/60Hz/18W	5 to 40°C	Wall	Supply Contractor	Contractor		Refer to shop drawings	CPG0465-I-01 Sheet 4			CPG0465-ML-01 Sheet 1
0004	0	AT-J001B	Analyser Indicator Transmitter	Softened Water Hardness Monitor	Hach	SP-510	120V/60Hz/18W	5 to 40°C	Wall	Supply Contractor	Contractor		Refer to shop drawings	CPG0465-I-01 Sheet 4			CPG0465-ML-01 Sheet 1
0005	0	TE-J003A	Temperature Element	Softened Water to Electrolyser Temperature					Thermowell	Supply Contractor	Contractor		Refer to shop drawings	CPG0465-I-01 Sheet 4			CPG0465-ML-01 Sheet 1
0006	0	TI-J003A	Temperature Indicator	Softened Water to Electrolyser Temperature						Supply Contractor	Contractor		Refer to shop drawings	CPG0465-I-01 Sheet 4			CPG0465-ML-01 Sheet 1
0007	0	TT-J003A	Temperature Transmitter	Softened Water to Electrolysers Temperature						Supply Contractor	Contractor	Head mounted indicator/transmitter	Refer to shop drawings	CPG0465-I-01 Sheet 4			CPG0465-ML-01 Sheet 1
0008	0	LE-J100A	Level Element	Salt Saturator TK-J100A Brine Level					Flange	Supply Contractor	Contractor		Refer to shop drawings	CPG0465-I-01 Sheet 4	WB-A0455	WB-A0401	CPG0465-ML-01 Sheet 1
0009	0	LI-J100A	Level Indicator	Salt Saturator TK-J100A Brine Level						Supply Contractor	Contractor		Refer to shop drawings	CPG0465-I-01 Sheet 4			CPG0465-ML-01 Sheet 1
0010	0	LT-J100A	Level Indicator Transmitter	Salt Saturator TK-J100A Brine Level			120V	TBC	Wall/ Stand	Supply Contractor	Contractor		Refer to shop drawings	CPG0465-I-01 Sheet 4			CPG0465-ML-01 Sheet 1
0011	0	SOL-J100A	Solenoid Actuator	Softened Water Flow Control Valve to Salt Saturator TK-J100A						Supply Contractor	Contractor		Refer to shop drawings	CPG0465-I-01 Sheet 4			CPG0465-ML-01 Sheet 1
0012	0	TE-J100A	Temperature Element	Salt Saturator TK-J100A Temperature						Supply Contractor	Contractor		Refer to shop drawings	CPG0465-I-01 Sheet 4			CPG0465-ML-01 Sheet 1
0013	0	TT-J100A	Temperature Transmitter	Salt Saturator TK-J100A Temperature						Supply Contractor	Contractor	Head mounted indicator/transmitter	Refer to shop drawings	CPG0465-I-01 Sheet 4			CPG0465-ML-01 Sheet 1
0014	0	LE-J100B	Level Element	Salt Saturator TK-J100A Salt Level	BinMaster	Smart Bob II			Flange	Supply Contractor	Contractor		Refer to shop drawings	CPG0465-I-01 Sheet 4	WB-A0455	WB-A0401	CPG0465-ML-01 Sheet 1
0015	0	LI-J100B	Level Indicator	Salt Saturator TK-J100A Salt Level	BinMaster	Smart Bob II				Supply Contractor	Contractor		Refer to shop drawings	CPG0465-I-01 Sheet 4			CPG0465-ML-01 Sheet 1
0016	0	LT-J100B	Level Transmitter	Salt Saturator TK-J100A Salt Level	BinMaster	Smart Bob II	120V	TBC	Wall/ Stand	Supply Contractor	Contractor		Refer to shop drawings	CPG0465-I-01 Sheet 4			CPG0465-ML-01 Sheet 1
0017	0	XA-J100A	Gas Alarm	Hydrogen Gas Detected Warning Lamp			120V			Supply Contractor	Contractor	Mounted at door of Hypochlorite Generation Room	Refer to shop drawings	CPG0465-I-01 Sheet 4			CPG0465-ML-01 Sheet 1
0018	0	LE-J200A	Level Element	Salt Saturator TK-J200A Brine Level					Flange	Supply Contractor	Contractor		Refer to shop drawings	CPG0465-I-01 Sheet 4	WB-A0455	WB-A0401	CPG0465-ML-01 Sheet 1
0019	0	LI-J200A	Level Indicator	Salt Saturator TK-J200A Brine Level						Supply Contractor	Contractor		Refer to shop drawings	CPG0465-I-01 Sheet 4			CPG0465-ML-01 Sheet 1
0020	0	LT-J200A	Level Indicator Transmitter	Salt Saturator TK-J200A Brine Level			120V	TBC	Wall/ Stand	Supply Contractor	Contractor		Refer to shop drawings	CPG0465-I-01 Sheet 4			CPG0465-ML-01 Sheet 1
0021	0	SOL-J200A	Solenoid Actuator	Softened Water Flow Control Valve to Salt Saturator TK-J200A						Supply Contractor	Contractor		Refer to shop drawings	CPG0465-I-01 Sheet 4			CPG0465-ML-01 Sheet 1
0022	0	TE-J200A	Temperature Element	Salt Saturator TK-J200A Temperature						Supply Contractor	Contractor		Refer to shop drawings	CPG0465-I-01 Sheet 4			CPG0465-ML-01 Sheet 1
0023	0	TT-J200A	Temperature Transmitter	Salt Saturator TK-J200A Temperature						Supply Contractor	Contractor		Refer to shop drawings	CPG0465-I-01 Sheet 4			CPG0465-ML-01 Sheet 1
0024	0	LE-J200B	Level Element	Salt Saturator TK-J200A Salt Level					Flange	Supply Contractor	Contractor		Refer to shop drawings	CPG0465-I-01 Sheet 4	WB-A0455	WB-A0401	CPG0465-ML-01 Sheet 1
0025	0	LI-J200B	Level Indicator	Salt Saturator TK-J200A Salt Level						Supply Contractor	Contractor		Refer to shop drawings	CPG0465-I-01 Sheet 4			CPG0465-ML-01 Sheet 1
0026	0	LT-J200B	Level Indicator Transmitter	Salt Saturator TK-J200A Salt Level			120V	TBC	Wall/ Stand	Supply Contractor	Contractor		Refer to shop drawings	CPG0465-I-01 Sheet 4			CPG0465-ML-01 Sheet 1

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RECORD NO.	REV. No.	TAG NAME	DESCRIPTION		MANUFACTURER	MODEL	POWER SUPPLY	CALIBRATED RANGE	MOUNTING	SUPPLIED BY	INSTALLED BY	COMMENTS	SPEC. DATA SHEET	P&ID DRAWING	INSTRUMENT LOOP DIA.	INSTALL-ATION DETAIL	LOCATION DWG.
			INSTRUMENT TYPE	SERVICE													
0027	0	FT-J400A	Flow Indicator	Softened Water Flow to Electrolyser EL-J400A					skid	Supply Contractor	Supply Contractor	Pre-wired to skid mounted non intrinsically safe junction box	Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0028	0	FT-J400B	Flow Switch	Softened Water Low Flow to Electrolyser EL-J400B					skid	Supply Contractor	Supply Contractor	Pre-wired to skid mounted non intrinsically safe junction box	Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0029	0	PI-J400A	Pressure Indicator	Softened Water Pressure to Electrolyser EL-J400A					skid	Supply Contractor	Supply Contractor	Pre-wired to skid mounted non intrinsically safe junction box	Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0030	0	PS-J400A	Pressure Switch	Brine Solution to Electrolyser EL-J400A High Pressure Alarm					skid	Supply Contractor	Supply Contractor	Pre-wired to skid mounted non intrinsically safe junction box	Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0031	0	SOL-J400A	Solenoid Actuator	Softened Water to Electrolyser ELC-J400A Control Valve Solenoid Operator					skid	Supply Contractor	Supply Contractor	Pre-wired to skid mounted non intrinsically safe junction box	Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0032	0	FS-J400C	Flow Switch	Electrolyser ELC-J400A/B Pressure Relief Valve Operating					skid	Supply Contractor	Supply Contractor	Pre-wired to skid mounted non intrinsically safe junction box	Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0033	0	PS-J400B	Pressure Switch	Electrolyser EL-J400A/B Rupture Disc Burst					skid	Supply Contractor	Supply Contractor	Pre-wired to skid mounted intrinsically safe junction box	Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0034	0	TS-J400B	Temperature Switch	Electrolytic Cell ELC-J400B High Temperature Level					skid	Supply Contractor	Supply Contractor	Pre-wired to skid mounted intrinsically safe junction box	Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0035	0	TS-J400C	Temperature Switch	Electrolytic Cell ELC-J400A High Temperature Level					skid	Supply Contractor	Supply Contractor	Pre-wired to skid mounted intrinsically safe junction box	Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0036	0	LS-J400A	Level Switch	Electrolytic Cell ELC-J400A High Level					skid	Supply Contractor	Supply Contractor	Pre-wired to skid mounted intrinsically safe junction box	Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0037	0	LS-J400B	Level Switch	Electrolytic Cell ELC-J400B High Level					skid	Supply Contractor	Supply Contractor	Pre-wired to skid mounted intrinsically safe junction box	Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0038	0	TS-J400A	Temperature Switch	Electrolyser Rectifier RT-J400A High Temperature					skid	Supply Contractor	Supply Contractor	Pre-wired to skid mounted non intrinsically safe junction box	Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0039	0	FT-J420A	Flow Indicator	Softened Water Flow to Electrolyser EL-J420A					skid	Supply Contractor	Supply Contractor	Pre-wired to skid mounted non intrinsically safe junction box	Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0040	0	FT-J420B	Flow Switch	Softened Water Low Flow to Electrolyser EL-J420B					skid	Supply Contractor	Supply Contractor	Pre-wired to skid mounted non intrinsically safe junction box	Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0041	0	PI-J420A	Pressure Indicator	Softened Water Pressure to Electrolyser EL-J420A					skid	Supply Contractor	Supply Contractor	Pre-wired to skid mounted non intrinsically safe junction box	Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0042	0	PS-J420A	Pressure Switch	Brine Solution to Electrolyser EL-J420A High Pressure Alarm					skid	Supply Contractor	Supply Contractor	Pre-wired to skid mounted non intrinsically safe junction box	Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0043	0	SOL-J420A	Solenoid Actuator	Softened Water to Electrolyser ELC-J420A Control Valve Solenoid Operator					skid	Supply Contractor	Supply Contractor	Pre-wired to skid mounted non intrinsically safe junction box	Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0044	0	FS-J420C	Flow Switch	Electrolyser ELC-J420A/B Pressure Relief Valve Operating					skid	Supply Contractor	Supply Contractor	Pre-wired to skid mounted non intrinsically safe junction box	Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1

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RECORD NO.	REV. No.	TAG NAME	DESCRIPTION		MANUFACTURER	MODEL	POWER SUPPLY	CALIBRATED RANGE	MOUNTING	SUPPLIED BY	INSTALLED BY	COMMENTS	SPEC. DATA SHEET	P&ID DRAWING	INSTRUMENT LOOP DIA.	INSTALL-ATION DETAIL	LOCATION DWG.
			INSTRUMENT TYPE	SERVICE													
0045	0	PS-J420B	Pressure Switch	Electrolyser EL-J420A/B Rupture Disc Burst					skid	Supply Contractor	Supply Contractor	Pre-wired to skid mounted intrinsically safe junction box	Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0046	0	TS-J420B	Temperature Switch	Electrolytic Cell ELC-J420B High Temperature Level					skid	Supply Contractor	Supply Contractor	Pre-wired to skid mounted intrinsically safe junction box	Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0047	0	TS-J420C	Temperature Switch	Electrolytic Cell ELC-J420A High Temperature Level					skid	Supply Contractor	Supply Contractor	Pre-wired to skid mounted intrinsically safe junction box	Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0048	0	LS-J420A	Level Switch	Electrolytic Cell ELC-J420A High Level					skid	Supply Contractor	Supply Contractor	Pre-wired to skid mounted intrinsically safe junction box	Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0049	0	LS-J420B	Level Switch	Electrolytic Cell ELC-J420B High Level					skid	Supply Contractor	Supply Contractor	Pre-wired to skid mounted intrinsically safe junction box	Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0050	0	TS-J420A	Temperature Switch	Electrolyser Rectifier RT-J420A High Temperature					skid	Supply Contractor	Supply Contractor	Pre-wired to skid mounted non intrinsically safe junction box	Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0051	0	FT-J440A	Flow Indicator	Softened Water Flow to Electrolyser EL-J440A					skid	Supply Contractor	Supply Contractor	Pre-wired to skid mounted non intrinsically safe junction box	Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0052	0	FT-J440B	Flow Switch	Softened Water Low Flow to Electrolyser EL-J440B					skid	Supply Contractor	Supply Contractor	Pre-wired to skid mounted non intrinsically safe junction box	Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0053	0	PI-J440A	Pressure Indicator	Softened Water Pressure to Electrolyser EL-J440A					skid	Supply Contractor	Supply Contractor	Pre-wired to skid mounted non intrinsically safe junction box	Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0054	0	PS-J440A	Pressure Switch	Brine Solution to Electrolyser EL-J440A High Pressure Alarm					skid	Supply Contractor	Supply Contractor	Pre-wired to skid mounted non intrinsically safe junction box	Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0055	0	SOL-J440A	Solenoid Actuator	Softened Water to Electrolyser ELC-J440A Control Valve Solenoid Operator					skid	Supply Contractor	Supply Contractor	Pre-wired to skid mounted non intrinsically safe junction box	Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0056	0	FS-J440C	Flow Switch	Electrolyser ELC-J440A/B Pressure Relief Valve Operating					skid	Supply Contractor	Supply Contractor	Pre-wired to skid mounted non intrinsically safe junction box	Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0057	0	PS-J440B	Pressure Switch	Electrolyser EL-J440A/B Rupture Disc Burst					skid	Supply Contractor	Supply Contractor	Pre-wired to skid mounted intrinsically safe junction box	Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0058	0	TS-J440B	Temperature Switch	Electrolytic Cell ELC-J440B High Temperature Level					skid	Supply Contractor	Supply Contractor	Pre-wired to skid mounted intrinsically safe junction box	Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0059	0	TS-J440C	Temperature Switch	Electrolytic Cell ELC-J440A High Temperature Level					skid	Supply Contractor	Supply Contractor	Pre-wired to skid mounted intrinsically safe junction box	Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0060	0	LS-J440A	Level Switch	Electrolytic Cell ELC-J440A High Level					skid	Supply Contractor	Supply Contractor	Pre-wired to skid mounted intrinsically safe junction box	Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0061	0	LS-J440B	Level Switch	Electrolytic Cell ELC-J440B High Level					skid	Supply Contractor	Supply Contractor	Pre-wired to skid mounted intrinsically safe junction box	Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0062	0	TS-J440A	Temperature Switch	Electrolyser Rectifier RT-J440A High Temperature					skid	Supply Contractor	Supply Contractor	Pre-wired to skid mounted non intrinsically safe junction box	Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1

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RECORD NO.	REV. No.	TAG NAME	DESCRIPTION		MANUFACTURER	MODEL	POWER SUPPLY	CALIBRATED RANGE	MOUNTING	SUPPLIED BY	INSTALLED BY	COMMENTS	SPEC. DATA SHEET	P&ID DRAWING	INSTRUMENT LOOP DIA.	INSTALL-ATION DETAIL	LOCATION DWG.
			INSTRUMENT TYPE	SERVICE													
0063	0	GI-J450A	Gas Indicator	Sodium Hypochlorite Generation Room Gas Detection						Supply Contractor	Contractor		Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0064	0	GE-J450A	Gas Element	Sodium Hypochlorite Generation Room Gas Detection						Supply Contractor	Contractor		Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0065	0	GT-J450A	Gas Transmitter	Sodium Hypochlorite Generation Room Gas Detection						Supply Contractor	Contractor		Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0066	0	GI-J450B	Gas Indicator	Sodium Hypochlorite Generation Room Gas Detection						Supply Contractor	Contractor		Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0067	0	GE-J450B	Gas Element	Sodium Hypochlorite Generation Room Gas Detection						Supply Contractor	Contractor		Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0068	0	GT-J450B	Gas Transmitter	Sodium Hypochlorite Generation Room Gas Detection						Supply Contractor	Contractor		Refer to shop drawings	CPG0465-I-01 Sheet 5			CPG0465-ML-01 Sheet 1
0069	0																CPG0465-ML-01 Sheet 1
0070	0	FS-J450A	Flow Switch	Stand PipeBlower BLW-J450A Low Air Flow						Supply Contractor	Contractor	Wired to intrinsically safe junction box JB-J405A		CPG0465-I-01 Sheet 6			CPG0465-ML-01 Sheet 1
0071	0	PS-J450A	Pressure Switch	Stand Pipe Blower BLW-J450A High Differential Pressure						Supply Contractor	Contractor	Wired to intrinsically safe junction box JB-J405A		CPG0465-I-01 Sheet 6			CPG0465-ML-01 Sheet 1
0072	0	FI-J002A	Flow Indicator	Softened Water to Sodium Hypochlorite Blending Station Flow										CPG0465-I-01 Sheet 6			CPG0465-ML-01 Sheet 1
0073	0	FI-J481A	Flow Indicator	12% Bulk Hypochlorite to Sodium Hypochlorite Blending Station Flow										CPG0465-I-01 Sheet 6			CPG0465-ML-01 Sheet 1
0074	0	FS-J500A	Flow Switch	Sodium Hypochlorite Storage Tank TK-J500A Ventilation Flow Low						Supply Contractor	Contractor	Wired to intrinsically safe junction box JB-J500A		CPG0465-I-01 Sheet 6			CPG0465-ML-01 Sheet 1
0075	0	PS-J500A	Pressure Switch	Sodium Hypochlorite Storage Tank TK-J500A Ventilation Differential Pressure High						Supply Contractor	Contractor	Wired to intrinsically safe junction box JB-J500A		CPG0465-I-01 Sheet 6			CPG0465-ML-01 Sheet 1
0076	0	LE-J500A	Level Element	Sodium Hypochlorite Storage Tank TK-J500A Level					Flange	Supply Contractor	Contractor			CPG0465-I-01 Sheet 6			CPG0465-ML-01 Sheet 1
0077	0	LI-J500A	Level Indicator	Sodium Hypochlorite Storage Tank TK-J500A Level						Supply Contractor	Contractor			CPG0465-I-01 Sheet 6			CPG0465-ML-01 Sheet 1
0078	0	LT-J500A	Level Transmitter	Sodium Hypochlorite Storage Tank TK-J500A Level			120V	TBC	Wall/ Stand	Supply Contractor	Contractor			CPG0465-I-01 Sheet 6			CPG0465-ML-01 Sheet 1
0079	0	GI-J550A	Gas Indicator	Sodium Hypochlorite Gas Detection						Supply Contractor	Contractor			CPG0465-I-01 Sheet 6			CPG0465-ML-01 Sheet 1
0080	0	GE-J550A	Gas Element	Sodium Hypochlorite Gas Detection						Supply Contractor	Contractor			CPG0465-I-01 Sheet 6			CPG0465-ML-01 Sheet 1
0081	0	GT-J550A	Gas Transmitter	Sodium Hypochlorite Gas Detection						Supply Contractor	Contractor			CPG0465-I-01 Sheet 6			CPG0465-ML-01 Sheet 1
0082	0	FS-J520A	Flow Switch	Sodium Hypochlorite Storage Tank TK-J520A Ventilation Flow Low						Supply Contractor	Contractor	Wired to intrinsically safe junction box JB-J520A		CPG0465-I-01 Sheet 7			CPG0465-ML-01 Sheet 1
0083	0	PS-J520A	Pressure Switch	Sodium Hypochlorite Storage Tank TK-J520A Ventilation Differential Pressure High						Supply Contractor	Contractor	Wired to intrinsically safe junction box JB-J520A		CPG0465-I-01 Sheet 7			CPG0465-ML-01 Sheet 1
0084	0	LE-J520A	Level Element	Sodium Hypochlorite Storage Tank TK-J520A Level					Flange	Supply Contractor	Contractor			CPG0465-I-01 Sheet 7			CPG0465-ML-01 Sheet 1
0085	0	LI-J520A	Level Indicator	Sodium Hypochlorite Storage Tank TK-J520A Level						Supply Contractor	Contractor			CPG0465-I-01 Sheet 7			CPG0465-ML-01 Sheet 1
0086	0	LT-J520A	Level Transmitter	Sodium Hypochlorite Storage Tank TK-J520A Level			120V	TBC	Wall/ Stand	Supply Contractor	Contractor			CPG0465-I-01 Sheet 7			CPG0465-ML-01 Sheet 1
0087	0	FS-J540A	Flow Switch	Sodium Hypochlorite Storage Tank TK-J540A Ventilation Flow Low						Supply Contractor	Contractor	Wired to intrinsically safe junction box JB-J540A		CPG0465-I-01 Sheet 6			CPG0465-ML-01 Sheet 1
0088	0	PS-J540A	Pressure Switch	Sodium Hypochlorite Storage Tank TK-J540A Ventilation Differential Pressure High						Supply Contractor	Contractor	Wired to intrinsically safe junction box JB-J540A		CPG0465-I-01 Sheet 7			CPG0465-ML-01 Sheet 1
0089	0	LE-J540A	Level Element	Sodium Hypochlorite Storage Tank TK-J540A Level					Flange	Supply Contractor	Contractor			CPG0465-I-01 Sheet 6			CPG0465-ML-01 Sheet 1

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RECORD NO.	REV. No.	TAG NAME	DESCRIPTION		MANUFACTURER	MODEL	POWER SUPPLY	CALIBRATED RANGE	MOUNTING	SUPPLIED BY	INSTALLED BY	COMMENTS	SPEC. DATA SHEET	P&ID DRAWING	INSTRUMENT LOOP DIA.	INSTALL-ATION DETAIL	LOCATION DWG.
			INSTRUMENT TYPE	SERVICE													
0090	0	LI-J540A	Level Indicator	Sodium Hypochlorite Storage Tank TK-J540A Level						Supply Contractor	Contractor			CPG0465-I-01 Sheet 7			CPG0465-ML-01 Sheet 1
0091	0	LT-J540A	Level Transmitter	Sodium Hypochlorite Storage Tank TK-J540A Level			120V	TBC	Wall/ Stand	Supply Contractor	Contractor			CPG0465-I-01 Sheet 7			CPG0465-ML-01 Sheet 1
0092	0	FS-J560A	Flow Switch	Sodium Hypochlorite Storage Tank TK-J560A Ventilation Flow Low						Supply Contractor	Contractor	Wired to intrinsically safe junction box JB-J560A		CPG0465-I-01 Sheet 7			CPG0465-ML-01 Sheet 1
0093	0	PS-J560A	Pressure Switch	Sodium Hypochlorite Storage Tank TK-J560A Ventilation Differential Pressure High						Supply Contractor	Contractor	Wired to intrinsically safe junction box JB-J560A		CPG0465-I-01 Sheet 7			CPG0465-ML-01 Sheet 1
0094	0	LE-J560A	Level Element	Sodium Hypochlorite Storage Tank TK-J560A Level					Flange	Supply Contractor	Contractor			CPG0465-I-01 Sheet 7			CPG0465-ML-01 Sheet 1
0095	0	LI-J560A	Level Indicator	Sodium Hypochlorite Storage Tank TK-J560A Level						Supply Contractor	Contractor			CPG0465-I-01 Sheet 7			CPG0465-ML-01 Sheet 1
0096	0	LT-J560A	Level Transmitter	Sodium Hypochlorite Storage Tank TK-J560A Level			120V	TBC	Wall/ Stand	Supply Contractor	Contractor			CPG0465-I-01 Sheet 7			CPG0465-ML-01 Sheet 1
0097	0	GI-J550B	Gas Indicator	Sodium Hypochlorite Gas Detection						Supply Contractor	Contractor			CPG0465-I-01 Sheet 7			CPG0465-ML-01 Sheet 1
0098	0	GE-J550B	Gas Element	Sodium Hypochlorite Gas Detection						Supply Contractor	Contractor			CPG0465-I-01 Sheet 7			CPG0465-ML-01 Sheet 1
0099	0	GT-J550B	Gas Transmitter	Sodium Hypochlorite Gas Detection						Supply Contractor	Contractor			CPG0465-I-01 Sheet 7			CPG0465-ML-01 Sheet 1
0100	0	LS-J550A	Conductivity Level Switch	Sodium Hypochlorite Containmentment Sump High			120V	6mm from floor of containment	Bracket	Supply Contractor	Contractor	To measure any liquid in containment		CPG0465-I-01 Sheet 7			CPG0465-ML-01 Sheet 1
0101	0	ZS-J610A	Position Switch	Pump Revolution on Pump P-J610A					Pump Skid	Supply Contractor	Supply Contractor	Wired to master control panel CP-J11		P-01			
0102	0	LS-J610A	Level Switch	Pump Case Level Switch (Leak Detection)					Pump Skid	Supply Contractor	Supply Contractor			P-01			
0103	0	PI-J610A	Pressure Indicator	Sodium Hypochlorite Pump P-J610A Outlet Pressure Indicator					Pump Skid	Supply Contractor	Supply Contractor			P-01			
0104	0	ZS-J620A	Position Switch	Pump Revolution on Pump P-J620A					Pump Skid	Supply Contractor	Supply Contractor	Wired to master control panel CP-J11		P-01			
0105	0	LS-J620A	Level Switch	Pump Case Level Switch (Leak Detection)					Pump Skid	Supply Contractor	Supply Contractor			P-01			
0106	0	PI-J620A	Pressure Indicator	Sodium Hypochlorite Pump P-J620A Outlet Pressure Indicator					Pump Skid	Supply Contractor	Supply Contractor			P-01			
0107	0	ZS-J640A	Position Switch	Pump Revolution on Pump P-J640A					Pump Skid	Supply Contractor	Supply Contractor	Wired to master control panel CP-J11		P-01			
0108	0	LS-J640A	Level Switch	Pump Case Level Switch (Leak Detection)					Pump Skid	Supply Contractor	Supply Contractor			P-01			
0109	0	PI-J640A	Pressure Indicator	Sodium Hypochlorite Pump P-J640A Outlet Pressure Indicator					Pump Skid	Supply Contractor	Supply Contractor			P-01			
0110	0	ZS-J660A	Position Switch	Pump Revolution on Pump P-J650A					Pump Skid	Supply Contractor	Supply Contractor	Wired to master control panel CP-J11		P-01			
0111	0	LS-J660A	Level Switch	Pump Case Level Switch (Leak Detection)					Pump Skid	Supply Contractor	Supply Contractor			P-01			
0112	0	PI-J660A	Pressure Indicator	Sodium Hypochlorite Pump P-J660A Outlet Pressure Indicator					Pump Skid	Supply Contractor	Supply Contractor			P-01			
0113	0	FE-J610A	Flow Element	Sodium Hypochlorite to Chlorine Contact Tank Influent Flow					Flange	Supply Contractor	Supply Contractor	50 mm		P-01			
0114	0	FI-J610A	Flow Indicator	Sodium Hypochlorite to Chlorine Contact Tank Influent Flow						Supply Contractor	Supply Contractor			P-01			
0115	0	FT-J610A	Flow Transmitter	Sodium Hypochlorite to Chlorine Contact Tank Influent Flow					Wall/ Stand	Supply Contractor	Supply Contractor			P-01			
0116	0	FE-J640A	Flow Element	Sodium Hypochlorite to Filtered Water Channel Flow					Flange	Supply Contractor	Supply Contractor	50 mm		P-01		WB-A0453	
0117	0	FI-J640A	Flow Indicator	Sodium Hypochlorite to Filtered Water Channel Flow						Supply Contractor	Supply Contractor			P-01			
0118	0	FT-J640A	Flow Transmitter	Sodium Hypochlorite to Filtered Water Channel Flow					Wall/ Stand	Supply Contractor	Supply Contractor			P-01			
0119	0																
0120	0																
0121	0																
0122	0	PI-S200A	Pressure Indicator	Rail Car Unloading Compressed Air Pressure				0-345 Kpa			Contractor	Contractor		WS-P0001			
0123	0	SOL-S200A	Solenoid Actuator	Rail Car Unloading Compressed Air Supply Control Valve			120VAC				Contractor	Contractor		WS-P0001			
0124	0	LCP-S200A	Local Control Panel	Bulk Sulphuric Acid Storage Tank TK-S210A & TK-S220A Rail Car Fill Control Panel							Contractor	Contractor		WS-P0001			
0125	0	PI-S204A	Pressure Indicator	Truck Unloading Compressed Air Pressure				0-345 Kpa			Contractor	Contractor		WS-P0001			
0126	0	SOL-S204A	Solenoid Actuator	Truck Unloading Compressed Air Supply Control Valve			120VAC				Contractor	Contractor		WS-P0001			
0127	0	SOL-S204B	Solenoid Actuator	Truck Unloading Compressed Air Purge Control Valve			120VAC				Contractor	Contractor		WS-P0001			

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RECORD NO.	REV. No.	TAG NAME	DESCRIPTION		MANUFACTURER	MODEL	POWER SUPPLY	CALIBRATED RANGE	MOUNTING	SUPPLIED BY	INSTALLED BY	COMMENTS	SPEC. DATA SHEET	P&ID DRAWING	INSTRUMENT LOOP DIA.	INSTALL-ATION DETAIL	LOCATION DWG.
			INSTRUMENT TYPE	SERVICE													
0128	0	FS-S750A	Flow Switch	Rail Car Unloading Emergency Shower Operating						Contractor	Contractor		I105	WS-P0001			
0129	0	FS-S758A	Flow Switch	Truck Unloading Emergency Shower Operating						Contractor	Contractor		I105	WS-P0001			
0130	0	LCP-S204A	Local Control Panel	Bulk Sulphuric Acid Storage Tank TK-S210A & TK-S220A Truck Fill Control Panel						Contractor	Contractor			WS-P0001			
0131	0	LI-S210B	Remote Indicator	Bulk Sulphuric Acid Storage Tank TK-S210A Level					Panel	Contractor	Contractor	Loop powered 3 digit		WS-P0001			
0132	0	LI-S210C	Remote Indicator	Bulk Sulphuric Acid Storage Tank TK-S210A Level					Panel	Contractor	Contractor	Loop powered 3 digit		WS-P0001			
0133	0	LI-S220B	Remote Indicator	Bulk Sulphuric Acid Storage Tank TK-S220A Level					Panel	Contractor	Contractor	Loop powered 3 digit		WS-P0001			
0134	0	LI-S220C	Remote Indicator	Bulk Sulphuric Acid Storage Tank TK-S220A Level					Panel	Contractor	Contractor	Loop powered 3 digit		WS-P0001			
0135	0	LS-S206A	Level Switch	Chemical Delivery Spill Catchment Manhole High Level			120VAC	6mm from floor of containment	Bracket	Contractor	Contractor	To measure any liquid in containment	I126	WS-P0001			
0136	0	LT-S210A	Level Transmitter	Bulk Sulphuric Acid Storage Tank TK-S210A Level			120VAC		Wall/ Stand	Contractor	Contractor		I120	WS-P0002	WB-A0455		
0137	0	LI-S210A	Level Indicator	Bulk Sulphuric Acid Storage Tank TK-S210A Level						Contractor	Contractor		I120	WS-P0002	WB-A0455		
0138	0	LE-S210A	Level Element	Bulk Sulphuric Acid Storage Tank TK-S210A Level					Flange	Contractor	Contractor		I120	WS-P0002	WB-A0455		
0139	0	PT-S210A	Pressure Transmitter	Bulk Sulphuric Acid Storage Tank TK-S210A Level			24vdc		Flange	Contractor	Contractor		I111	WS-P0002			
0140	0	LT-S220A	Level Transmitter	Bulk Sulphuric Acid Storage Tank TK-S220A Level			120VAC		Wall/ Stand	Contractor	Contractor		I120	WS-P0002	WB-A0455		
0141	0	LI-S220A	Level Indicator	Bulk Sulphuric Acid Storage Tank TK-S220A Level						Contractor	Contractor		I120	WS-P0002	WB-A0455		
0142	0	LE-S220A	Level Element	Bulk Sulphuric Acid Storage Tank TK-S220A Level						Contractor	Contractor		I120	WS-P0002	WB-A0455		
0143	0	PT-S220A	Pressure Transmitter	Bulk Sulphuric Acid Storage Tank TK-S220A Level			24vdc		Flange	Contractor	Contractor		I111	WS-P0002			
0144	0	FS-S755A	Flow Switch	Bulk Sulphuric Acid Storage Room Emergency Shower Operating						Contractor	Contractor		I105	WS-P0002			
0145	0	PI-S230A	Pressure Indicator	Sulphuric Acid Feed Pump P-S230A Outlet Pressure				0-300 Kpa		Contractor	Contractor			WS-P0003			
0146	0	FT-S235A	Flow Transmitter	Sulphuric Acid Feed Pump P-S230A Discharge Flow			120VAC		Wall/ Stand	Contractor	Contractor		I100A	WS-P0003	WB-A0453	WB-A0453	
0147	0	FI-S235A	Flow Indicator	Sulphuric Acid Feed Pump P-S230A Discharge Flow						Contractor	Contractor		I100A	WS-P0003	WB-A0453	WB-A0453	
0148	0	FE-S235A	Flow Element	Sulphuric Acid Feed Pump P-S230A Discharge Flow				0-5 ltr/min	Flange	Contractor	Contractor	Size to be determined by pump skid designer	I100A	WS-P0003	WB-A0453	WB-A0453	
0149	0	PI-S240A	Pressure Indicator	Sulphuric Acid Feed Pump P-S240A Outlet Pressure				0-300 Kpa		Contractor	Contractor			WS-P0003			
0150	0	PI-S250A	Pressure Indicator	Sulphuric Acid Feed Pump P-S250A Outlet Pressure				0-300 Kpa		Contractor	Contractor			WS-P0003			
0151	0	FT-S250A	Flow Transmitter	Sulphuric Acid Feed Pump P-S250A Discharge Flow			120VAC		Wall/ Stand	Contractor	Contractor		I100A	WS-P0003	WB-A0453	WB-A0453	
0152	0	FI-S250A	Flow Indicator	Sulphuric Acid Feed Pump P-S250A Discharge Flow						Contractor	Contractor		I100A	WS-P0003	WB-A0453	WB-A0453	
0153	0	FE-S250A	Flow Element	Sulphuric Acid Feed Pump P-S250A Discharge Flow				0-5 ltr/min	Flange	Contractor	Contractor	Size to be determined by pump skid designer	I100A	WS-P0003	WB-A0453	WB-A0453	
0154	0	LS-S260A	Level Switch	Bulk Sulphuric Acid Spill Containment High Level				6mm from floor of containment		Contractor	Contractor	To measure any liquid in containment	I126	WS-P0003	WB-A0458		
0155	0	LA-S260B	Level Alarm	Bulk Sulphuric Acid Containment High Level Visual Alarm Mounted Outside Door to Room			120VAC			Contractor	Contractor	Warning lamp mounted outside room above door		WS-P0002			
0156	0	LS-S260B	Level Switch	Bulk Sulphuric Acid Spill Containment (North Sump) High Level				6mm from floor of containment		Contractor	Contractor	To measure any liquid in containment	I126	WS-P0003	WB-A0458		
0157	0	PI-S100A	Pressure Indicator	Rail Car Unloading Compressed Air Pressure				0-370 Kpa		Contractor	Contractor			WS-P0004			
0158	0	SOL-S100A	Solenoid Actuator	Rail Car Unloading Compressed Air Supply Control Valve						Contractor	Contractor			WS-P0004			
0159	0	LCP-S201A	Local Control Panel	Bulk Ferric Chloride Storage Tanks TK-S110A, TK-S120A, TK-S130A, TK-S140A Rail Car Fill Control Panel						Contractor	Contractor			WS-P0004			
0160	0	PI-S105A	Pressure Indicator	Truck Unloading Compressed Air Pressure				0-370 Kpa		Contractor	Contractor			WS-P0004			
0161	0	SOL-S105A	Solenoid Actuator	Truck Unloading Compressed Air Supply Control Valve						Contractor	Contractor			WS-P0004			
0162	0	SOL-S105B	Solenoid Actuator	Truck Unloading Compressed Air Purge Control Valve						Contractor	Contractor			WS-P0004			
0163	0	LCP-S201C	Local Control Panel	Bulk Ferric Chloride Storage Tank TK-S110A, TK-S120A, TK-S130A, TK-S140A Truck Fill Control Panel						Contractor	Contractor			WS-P0004			
0164	0	FS-S751A	Flow Switch	Rail Car Unloading Emergency Shower Operating						Contractor	Contractor		I105	WS-P0004			
0165	0	LI-S110B	Remote Indicator	Bulk Ferric Chloride Storage Tank TK-S110A Level					Panel	Contractor	Contractor	Loop powered 3 digit		WS-P0004			
0166	0	LI-S110C	Remote Indicator	Bulk Ferric Chloride Storage Tank TK-S110A Level					Panel	Contractor	Contractor	Loop powered 3 digit		WS-P0004			
0167	0	LI-S120B	Remote Indicator	Bulk Ferric Chloride Storage Tank TK-S120A Level					Panel	Contractor	Contractor	Loop powered 3 digit		WS-P0004			
0168	0	LI-S120C	Remote Indicator	Bulk Ferric Chloride Storage Tank TK-S120A Level					Panel	Contractor	Contractor	Loop powered 3 digit		WS-P0004			
0169	0	LI-S130B	Remote Indicator	Bulk Ferric Chloride Storage Tank TK-S130A Level					Panel	Contractor	Contractor	Loop powered 3 digit		WS-P0004			
0170	0	LI-S130C	Remote Indicator	Bulk Ferric Chloride Storage Tank TK-S130A Level					Panel	Contractor	Contractor	Loop powered 3 digit		WS-P0004			
0171	0	LI-S140B	Remote Indicator	Bulk Ferric Chloride Storage Tank TK-S140A Level					Panel	Contractor	Contractor	Loop powered 3 digit		WS-P0004			

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RECORD NO.	REV. No.	TAG NAME	DESCRIPTION		MANUFACTURER	MODEL	POWER SUPPLY	CALIBRATED RANGE	MOUNTING	SUPPLIED BY	INSTALLED BY	COMMENTS	SPEC. DATA SHEET	P&ID DRAWING	INSTRUMENT LOOP DIA.	INSTALL-ATION DETAIL	LOCATION DWG.
			INSTRUMENT TYPE	SERVICE													
0172	0	LI-S140C	Remote Indicator	Bulk Ferric Chloride Storage Tank TK-S140A Level					Panel	Contractor	Contractor	Loop powered 3 digit		WS-P0004			
0173	0	LT-S110A	Level Transmitter	Bulk Ferric Chloride Storage Tank TK-S110A Level			120VAC	0-8 mtrs	Wall/ Stand	Contractor	Contractor		I120	WS-P0005	WB-A0455		
0174	0	LI-S110A	Level Indicator	Bulk Ferric Chloride Storage Tank TK-S110A Level						Contractor	Contractor		I120	WS-P0005	WB-A0455		
0175	0	LE-S110A	Level Element	Bulk Ferric Chloride Storage Tank TK-S110A Level					Flange	Contractor	Contractor		I120	WS-P0005	WB-A0455		
0176	0	PT-S110A	Pressure Transmitter	Bulk Ferric Chloride Storage Tank TK-S110A Level			24vdc		Flange	Contractor	Contractor		I111	WS-P0005			
0177	0	LT-S120A	Level Transmitter	Bulk Ferric Chloride Storage Tank TK-S120A Level			120VAC	0-8 mtrs	Wall/ Stand	Contractor	Contractor		I120	WS-P0005	WB-A0455		
0178	0	LI-S120A	Level Indicator	Bulk Ferric Chloride Storage Tank TK-S120A Level						Contractor	Contractor		I120	WS-P0005	WB-A0455		
0179	0	LE-S120A	Level Element	Bulk Ferric Chloride Storage Tank TK-S120A Level					Flange	Contractor	Contractor		I120	WS-P0005	WB-A0455		
0180	0	PT-S120A	Pressure Transmitter	Bulk Ferric Chloride Storage Tank TK-S120A Level			24vdc		Flange	Contractor	Contractor		I111	WS-P0005			
0181	0	LT-S130A	Level Transmitter	Bulk Ferric Chloride Storage Tank TK-S130A Level			120VAC	0-8 mtrs	Wall/ Stand	Contractor	Contractor		I120	WS-P0006	WB-A0455		
0182	0	LI-S130A	Level Indicator	Bulk Ferric Chloride Storage Tank TK-S130A Level						Contractor	Contractor		I120	WS-P0006	WB-A0455		
0183	0	LE-S130A	Level Element	Bulk Ferric Chloride Storage Tank TK-S130A Level					Flange	Contractor	Contractor		I120	WS-P0006	WB-A0455		
0184	0	PT-S130A	Pressure Transmitter	Bulk Ferric Chloride Storage Tank TK-S130A Level			24vdc	0-8 mtrs	Flange	Contractor	Contractor		I111	WS-P0006			
0185	0	LT-S140A	Level Transmitter	Bulk Ferric Chloride Storage Tank TK-S140A Level			120VAC	0-8 mtrs	Wall/ Stand	Contractor	Contractor		I120	WS-P0006	WB-A0455		
0186	0	LI-S140A	Level Indicator	Bulk Ferric Chloride Storage Tank TK-S140A Level						Contractor	Contractor		I120	WS-P0006	WB-A0455		
0187	0	LE-S140A	Level Element	Bulk Ferric Chloride Storage Tank TK-S140A Level					Flange	Contractor	Contractor		I120	WS-P0006	WB-A0455		
0188	0	PT-S140A	Pressure Transmitter	Bulk Ferric Chloride Storage Tank TK-S140A Level			24vdc	0-8 mtrs	Flange	Contractor	Contractor		I111	WS-P0006			
0189	0	PI-S160A	Pressure Indicator	Ferric Chloride Feed Pump P-S160A Outlet Pressure				0-300 Kpa		Contractor	Contractor			WS-P0007			
0190	0	FT-S165A	Flow Transmitter	Ferric Chloride Feed Pump P-S160A Discharge Flow					Wall/ Stand	Contractor	Contractor		I100B	WS-P0007	WB-A0453	WB-A0453	
0191	0	FI-S165A	Flow Indicator	Ferric Chloride Feed Pump P-S160A Discharge Flow						Contractor	Contractor		I100B	WS-P0007	WB-A0453	WB-A0453	
0192	0	FE-S165A	Flow Element	Ferric Chloride Feed Pump P-S160A Discharge Flow				0-15 ltr/min	Flange	Contractor	Contractor	Size to be determined by pump skid designer	I100B	WS-P0007	WB-A0453	WB-A0453	
0193	0	PI-S170A	Pressure Indicator	Ferric Chloride Feed Pump P-S170A Outlet Pressure				0-300 Kpa		Contractor	Contractor			WS-P0007			
0194	0	PI-S180A	Pressure Indicator	Ferric Chloride Feed Pump P-S180A Outlet Pressure				0-300 Kpa		Contractor	Contractor			WS-P0007			
0195	0	FT-S185A	Flow Transmitter	Ferric Chloride Feed Pump P-S180A Discharge Flow					Wall/ Stand	Contractor	Contractor		I100B	WS-P0007	WB-A0453	WB-A0453	
0196	0	FI-S185A	Flow Indicator	Ferric Chloride Feed Pump P-S180A Discharge Flow						Contractor	Contractor		I100B	WS-P0007	WB-A0453	WB-A0453	
0197	0	FE-S185A	Flow Element	Ferric Chloride Feed Pump P-S180A Discharge Flow				0-15 ltr/min	Flange	Contractor	Contractor	Size to be determined by pump skid designer	I100B	WS-P0007	WB-A0453	WB-A0453	
0198	0	LS-S190A	Level Switch	Ferric Chloride Containment Level High				6mm from floor of containment		Contractor	Contractor	To measure any liquid in containment	I126	WS-P0007	WB-A0458		
0199	0	LA-S190B	Level Alarm	Bulk Ferric Chloride Containment High Level			120VAC			Contractor	Contractor	Warning lamp mounted outside room above door		WS-P0006			
0200	0	LS-S190B	Level Switch	Ferric Chloride Containment (North Sump) Level High				6mm from floor of containment		Contractor	Contractor	To measure any liquid in containment	I126	WS-P0007	WB-A0458		
0201	0	PI-S307A	Pressure Indicator	Truck Unloading Compressed Air Pressure				0-370 Kpa		Contractor	Contractor			WS-P0008			
0202	0	PI-S300A	Pressure Indicator	Rail Car Unloading Compressed Air Pressure				0-370 Kpa		Contractor	Contractor			WS-P0008			
0203	0	SOL-S300A	Solenoid Actuator	Rail Car Unloading Compressed Air Supply Control Valve			120VAC			Contractor	Contractor			WS-P0008			
0204	0	SOL-S300B	Solenoid Actuator	Rail Car Unloading Compressed Air Purge Control Valve			120VAC			Contractor	Contractor			WS-P0008			
0205	0	LCP-S301A	Local Control Panel	Sodium Hydroxide Storage Tanks TK-S310A, TK-S320A, TK-S330A, TK-S340A Rail Car Fill Control Panel						Contractor	Contractor			WS-P0008			
0206	0	SOL-S307A	Solenoid Actuator	Truck Unloading Compressed Air Supply Control Valve			120VAC			Contractor	Contractor			WS-P0008			
0207	0	LCP-S307A	Local Control Panel	Sodium Hydroxide Storage Tanks TK-S310A, TK-S320A, TK-S330A, TK-S340A Truck Fill Control Panel						Contractor	Contractor			WS-P0008			
0208	0	LI-S310B	Remote Indicator	Bulk Sodium Hydroxide Storage Tank TK-S310A Level					Panel	Contractor	Contractor	Loop powered 3 digit		WS-P0008			
0209	0	LI-S310C	Remote Indicator	Bulk Sodium Hydroxide Storage Tank TK-S310A Level					Panel	Contractor	Contractor	Loop powered 3 digit		WS-P0008			
0210	0	LI-S320B	Remote Indicator	Bulk Sodium Hydroxide Storage Tank TK-S320A Level					Panel	Contractor	Contractor	Loop powered 3 digit		WS-P0008			
0211	0	LI-S320C	Remote Indicator	Bulk Sodium Hydroxide Storage Tank TK-S320A Level					Panel	Contractor	Contractor	Loop powered 3 digit		WS-P0008			
0212	0	LI-S330B	Remote Indicator	Bulk Sodium Hydroxide Storage Tank TK-S330A Level					Panel	Contractor	Contractor	Loop powered 3 digit		WS-P0008			
0213	0	LI-S330C	Remote Indicator	Bulk Sodium Hydroxide Storage Tank TK-S330A Level					Panel	Contractor	Contractor	Loop powered 3 digit		WS-P0008			
0214	0	LI-S340B	Remote Indicator	Bulk Sodium Hydroxide Storage Tank TK-S340A Level					Panel	Contractor	Contractor	Loop powered 3 digit		WS-P0008			
0215	0	LI-S340C	Remote Indicator	Bulk Sodium Hydroxide Storage Tank TK-S340A Level					Panel	Contractor	Contractor	Loop powered 3 digit		WS-P0008			
0216	0	FS-S759A	Flow Switch	Truck Unloading Emergency Shower Operating						Contractor	Contractor		I105	WS-P0008			
0217	0	LS-S309A	Level Switch	Chemical Delivery Spill Catchment Manhole High Level			120VAC	6mm from floor of containment	Bracket	Contractor	Contractor	To measure any liquid in containment	I126	WS-P0008			



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RECORD NO.	REV. No.	TAG NAME	DESCRIPTION		MANUFACTURER	MODEL	POWER SUPPLY	CALIBRATED RANGE	MOUNTING	SUPPLIED BY	INSTALLED BY	COMMENTS	SPEC. DATA SHEET	P&ID DRAWING	INSTRUMENT LOOP DIA.	INSTALL-ATION DETAIL	LOCATION DWG.
			INSTRUMENT TYPE	SERVICE													
0218	0	TI-S310A	Temperature Indicator	Bulk Sodium Hydroxide Storage Tank TK-S310A Temperature						Contractor	Contractor	Loop powered 3 digit		WS-P0009			
0219	0	TT-S310A	Temperature Transmitter	Bulk Sodium Hydroxide Storage Tank TK-S310A Temperature			24vdc		Thermowell	Contractor	Contractor		I131	WS-P0009			
0220	0	LT-S310A	Level Transmitter	Bulk Sodium Hydroxide Storage Tank TK-S310A Level			120VAC	0-8 mtrs		Contractor	Contractor		I120	WS-P0009	WB-A0455		
0221	0	LI-S310A	Level Indicator	Bulk Sodium Hydroxide Storage Tank TK-S310A Level						Contractor	Contractor		I120	WS-P0009	WB-A0455		
0222	0	LE-S310A	Level Element	Bulk Sodium Hydroxide Storage Tank TK-S310A Level					Flange	Contractor	Contractor		I120	WS-P0009	WB-A0455		
0223	0	PT-S310A	Pressure Transmitter	Bulk Sodium Hydroxide Storage Tank TK-S310A Level			24vdc	0-8 mtrs		Contractor	Contractor		I111	WS-P0009			
0224	0	TI-S320A	Temperature Indicator	Bulk Sodium Hydroxide Storage Tank TK-S320A Temperature						Contractor	Contractor	Loop powered 3 digit		WS-P0009			
0225	0	TT-S320A	Temperature Transmitter	Bulk Sodium Hydroxide Storage Tank TK-S320A Temperature			24vdc		Thermowell	Contractor	Contractor		I131	WS-P0009			
0226	0	LT-S320A	Level Transmitter	Bulk Sodium Hydroxide Storage Tank TK-S320A Level			120VAC	0-8 mtrs	Wall/ Stand	Contractor	Contractor		I120	WS-P0009	WB-A0455		
0227	0	LI-S320A	Level Indicator	Bulk Sodium Hydroxide Storage Tank TK-S320A Level						Contractor	Contractor		I120	WS-P0009	WB-A0455		
0228	0	LE-S320A	Level Element	Bulk Sodium Hydroxide Storage Tank TK-S320A Level					Flange	Contractor	Contractor		I120	WS-P0009	WB-A0455		
0229	0	FS-S754A	Flow Switch	Bulk Sodium Hydroxide Storage Room Unloading Emergency Shower Operating						Contractor	Contractor		I105	WS-P0009			
0230	0	PT-S320A	Pressure Transmitter	Bulk Sodium Hydroxide Storage Tank TK-S320A Level			24vdc	0-8 mtrs		Contractor	Contractor		I111	WS-P0009			
0231	0	TI-S330A	Temperature Indicator	Bulk Sodium Hydroxide Storage Tank TK-S330A Temperature						Contractor	Contractor	Loop powered 3 digit		WS-P0010			
0232	0	TT-S330A	Temperature Transmitter	Bulk Sodium Hydroxide Storage Tank TK-S330A Temperature			24vdc		Thermowell	Contractor	Contractor		I131	WS-P0010			
0233	0	LT-S330A	Level Transmitter	Bulk Sodium Hydroxide Storage Tank TK-S330A Level			120VAC	0-8 mtrs	Wall/ Stand	Contractor	Contractor		I120	WS-P0010	WB-A0455		
0234	0	LI-S330A	Level Indicator	Bulk Sodium Hydroxide Storage Tank TK-S330A Level						Contractor	Contractor		I120	WS-P0010	WB-A0455		
0235	0	LE-S330A	Level Element	Bulk Sodium Hydroxide Storage Tank TK-S330A Level					Flange	Contractor	Contractor		I120	WS-P0010	WB-A0455		
0236	0	PT-S330A	Pressure Transmitter	Bulk Sodium Hydroxide Storage Tank TK-S330A Level			24vdc	0-8 mtrs		Contractor	Contractor		I111	WS-P0010			
0237	0	TI-S340A	Temperature Indicator	Bulk Sodium Hydroxide Storage Tank TK-S340A Temperature						Contractor	Contractor	Loop powered 3 digit		WS-P0010			
0238	0	TT-S340A	Temperature Transmitter	Bulk Sodium Hydroxide Storage Tank TK-S340A Temperature			24vdc		Thermowell	Contractor	Contractor		I131	WS-P0010			
0239	0	LT-S340A	Level Transmitter	Bulk Sodium Hydroxide Storage Tank TK-S340A Level			120VAC	0-8 mtrs		Contractor	Contractor		I120	WS-P0010	WB-A0455		
0240	0	LI-S340A	Level Indicator	Bulk Sodium Hydroxide Storage Tank TK-S340A Level						Contractor	Contractor		I120	WS-P0010	WB-A0455		
0241	0	LE-S340A	Level Element	Bulk Sodium Hydroxide Storage Tank TK-S340A Level					Flange	Contractor	Contractor		I120	WS-P0010	WB-A0455		
0242	0	PT-S340A	Pressure Transmitter	Bulk Sodium Hydroxide Storage Tank TK-S340A Level			24vdc	0-8 mtrs		Contractor	Contractor		I111	WS-P0010			
0243	0	PI-S350A	Pressure Indicator	Sodium Hydroxide Feed Pump P-S350A Outlet Pressure				0-300 Kpa		Contractor	Contractor			WS-P0011			
0244	0	FT-S350A	Flow Transmitter	Sodium Hydroxide Feed Pump P-S350A Discharge Flow			120VAC		Wall/ Stand	Contractor	Contractor		I100C	WS-P0011	WB-A0453	WB-A0453	
0245	0	FI-S350A	Flow Indicator	Sodium Hydroxide Feed Pump P-S250A Discharge Flow						Contractor	Contractor		I100C	WS-P0011	WB-A0453	WB-A0453	
0246	0	FE-S350A	Flow Element	Sodium Hydroxide Feed Pump P-S350A Discharge Flow				0-30 ltr/min	Flange	Contractor	Contractor	Size to be determined by pump skid designer	I100C	WS-P0011	WB-A0453	WB-A0453	
0247	0	PI-S360A	Pressure Indicator	Sodium Hydroxide Feed Pump P-S360A Outlet Pressure				0-300 Kpa		Contractor	Contractor			WS-P0011			
0248	0	PI-S370A	Pressure Indicator	Sodium Hydroxide Feed Pump P-S360A Outlet Pressure				0-300 Kpa		Contractor	Contractor			WS-P0011			
0249	0	FT-S370A	Flow Transmitter	Sodium Hydroxide Feed Pump P-S360A Discharge Flow			120VAC		Wall/ Stand	Contractor	Contractor		I100C	WS-P0011	WB-A0453	WB-A0453	
0250	0	FI-S370A	Flow Indicator	Sodium Hydroxide Feed Pump P-S360A Discharge Flow						Contractor	Contractor		I100C	WS-P0011	WB-A0453	WB-A0453	
0251	0	FE-S370A	Flow Element	Sodium Hydroxide Feed Pump P-S370A Discharge Flow				0-30 ltr/min	Flange	Contractor	Contractor	Size to be determined by pump skid designer	I100C	WS-P0011	WB-A0453	WB-A0453	
0252	0	LS-S371A	Level Switch	Sodium Hydroxide Containment High Level				6mm from floor of containment		Contractor	Contractor	To measure any liquid in containment	I126	WS-P0011	WB-A0458		
0253	0	LA-S371B	Level Alarm	Bulk Sodium Hydroxide Containment High Level Visual Alarm			120VAC			Contractor	Contractor	Warning lamp mounted outside room above door		WS-P0009			
0254	0	LS-S371B	Level Switch	Sodium Hydroxide Containment (North Sump) High Level				6mm from floor of containment		Contractor	Contractor	To measure any liquid in containment	I126	WS-P0011	WB-A0458		
0255	0	FS-S752A	Flow Switch	Bulk Ammonia Storage Room Emergency Shower Operating									I105	WS-P0012			
0256	0	PI-S401A	Pressure Indicator	Truck Unloading Compressed Air Pressure				0-370 Kpa		Contractor	Contractor			WS-P0012			
0257	0	SOL-S401A	Solenoid Actuator	Truck Unloading Compressed Air Supply Control Valve			120VAC			Contractor	Contractor			WS-P0012			
0258	0	LI-S410B	Remote Indicator	Bulk Ammonia Storage Tank TK-S410A Level					Panel	Contractor	Contractor	Loop powered 3 digit		WS-P0012			
0259	0	LI-S410B	Remote Indicator	Bulk Ammonia Storage Tank TK-S420A Level					Panel	Contractor	Contractor	Loop powered 3 digit		WS-P0012			
0260	0	LCP-S401A	Local Control Panel	Sodium Hydroxide Storage Tanks TK-S310A, TK-S320A, TK-S330A, TK-S340A Truck Fill Control Panel						Contractor	Contractor			WS-P0012			
0261	0	PI-S410A	Pressure Indicator	Bulk Ammonia Storage Tank TK-S410A Pressure				0-220 Kpa		Contractor	Contractor			WS-P0013			
0262	0	PS-S410A	Pressure Switch	Bulk Ammonia Storage Tank TK-S410A Pressure Relief Valve Operating				140 Kpa		Contractor	Contractor	Connected into PRV tank connection		WS-P0013			
0263	0	LE-S410A	Level Element	Bulk Ammonia Storage Tank TK-S410A Level					Flange	Contractor	Contractor			WS-P0013			

INSTRUMENT INDEX

RECORD NO.	REV. No.	TAG NAME	DESCRIPTION		MANUFACTURER	MODEL	POWER SUPPLY	CALIBRATED RANGE	MOUNTING	SUPPLIED BY	INSTALLED BY	COMMENTS	SPEC. DATA SHEET	P&ID DRAWING	INSTRUMENT LOOP DIA.	INSTALL-ATION DETAIL	LOCATION DWG.
			INSTRUMENT TYPE	SERVICE													
0264	0	LI-S410A	Level Indicator	Bulk Ammonia Storage Tank TK-S410A Level						Contractor	Contractor			WS-P0013			
0265	0	LT-S410A	Level Transmitter	Bulk Ammonia Storage Tank TK-S410A Level			120VAC	0-8 mtrs	Wall/ Stand	Contractor	Contractor			WS-P0013			
0266	0	LE-S410B	Level Element	Bulk Ammonia Storage Tank TK-S410A Level					Flange	Contractor	Contractor			WS-P0013			
0267	0	LI-S410B	Level Indicator	Bulk Ammonia Storage Tank TK-S410A Level						Contractor	Contractor			WS-P0013			
0268	0	LT-S410B	Level Transmitter	Bulk Ammonia Storage Tank TK-S410A Level			120VAC	0-8 mtrs	Wall/ Stand	Contractor	Contractor			WS-P0013			
0269	0	PI-S420A	Pressure Indicator	Bulk Ammonia Storage Tank TK-S420A Pressure				0-220 Kpa		Contractor	Contractor			WS-P0013			
0270	0	PS-S420A	Pressure Switch	Bulk Ammonia Storage Tank TK-S420A Pressure Relief Valve Operating				140 Kpa		Contractor	Contractor	Connected into PRV tank connection		WS-P0013			
0271	0	LE-S420A	Level Element	Bulk Ammonia Storage Tank TK-S420A Level					Flange	Contractor	Contractor			WS-P0013			
0272	0	LI-S420A	Level Indicator	Bulk Ammonia Storage Tank TK-S420A Level						Contractor	Contractor			WS-P0013			
0273	0	LT-S420A	Level Transmitter	Bulk Ammonia Storage Tank TK-S420A Level			120VAC	0-5 mtrs	Wall/ Stand	Contractor	Contractor			WS-P0013			
0274	0	LE-S420B	Level Element	Bulk Ammonia Storage Tank TK-S420A Level					Flange	Contractor	Contractor			WS-P0013			
0275	0	LI-S420B	Level Indicator	Bulk Ammonia Storage Tank TK-S420A Level						Contractor	Contractor			WS-P0013			
0276	0	LT-S420B	Level Transmitter	Bulk Ammonia Storage Tank TK-S420A Level			120VAC	0-5 mtrs	Wall/ Stand	Contractor	Contractor			WS-P0013			
0277	0	GT-S450A	Gas Transmitter	Ammonia Gas Detector						Contractor	Contractor	Indicator mounted at low level		WS-P0013			
0278	0	GE-S450A	Gas Element	Ammonia Gas Detector						Contractor	Contractor			WS-P0013			
0279	0	LS-S405A	Level Switch	Ammonia Storage Tank PRV Vent Water Column Level Low						Contractor	Contractor	Mounted into top of water column container	I126	WS-P0013	WB-A0458		
0280	0	SOL-S405A	Solenoid Actuator	Ammonia Storage Tank PRV Vent Water Column Water Supply Valve			120VAC			Contractor	Contractor			WS-P0013			
0281	0	LS-S405B	Level Switch	Ammonia Storage Tank PRV Vent Water Column Level Low						Contractor	Contractor	Mounted into top of water column container	I126	WS-P0013	WB-A0458		
0282	0	SOL-S405B	Solenoid Actuator	Ammonia Storage Tank PRV Vent Water Column Water Supply Valve			120VAC			Contractor	Contractor			WS-P0013			
0283	0	PI-S430A	Pressure Indicator	Ammonia Feed Pump P-S430A Outlet Pressure				0-300 Kpa		Contractor	Contractor			WS-P0014			
0284	0	FT-S430A	Flow Transmitter	Ammonia Feed Pump P-S430A Discharge Flow			120VAC		Wall/ Stand	Contractor	Contractor		I100D	WS-P0014	WB-A0453	WB-A0453	
0285	0	FI-S430A	Flow Indicator	Ammonia Feed Pump P-S430A Discharge Flow						Contractor	Contractor		I100D	WS-P0014	WB-A0453	WB-A0453	
0286	0	FE-S430A	Flow Element	Ammonia Feed Pump P-S430A Discharge Flow				0-2 ltr/min		Contractor	Contractor	Size to be determined by pump skid designer	I100D	WS-P0014	WB-A0453	WB-A0453	
0287	0	PI-S440A	Pressure Indicator	Ammonia Feed Pump P-S440A Outlet Pressure				0-300 Kpa		Contractor	Contractor			WS-P0014			
0288	0	FT-S440A	Flow Transmitter	Ammonia Feed Pump P-S440A Discharge Flow			120VAC		Wall/ Stand	Contractor	Contractor		I100D	WS-P0014	WB-A0453	WB-A0453	
0289	0	FI-S440A	Flow Indicator	Ammonia Feed Pump P-S440A Discharge Flow						Contractor	Contractor		I100D	WS-P0014	WB-A0453	WB-A0453	
0290	0	FE-S440A	Flow Element	Ammonia Feed Pump P-S440A Discharge Flow				0-2 ltr/min		Contractor	Contractor	Size to be determined by pump skid designer	I100D	WS-P0014	WB-A0453	WB-A0453	
0291	0	LS-S450A	Level Switch	Ammonia Containment Level				6mm from floor of containment		Contractor	Contractor	To measure any liquid in containment	I126	WS-P0014	WB-A0458		
0292	0	LA-S371B	Level Alarm	Bulk Ammonia Containment High Level Visual Alarm			120VAC			Contractor	Contractor	Warning lamp mounted outside room above door		WS-P0013			
0293	0	AT-S701A	Hardness Analyser	Softened Water to Steam Boiler Analyser			120VAC			Contractor	Contractor	Hach APA 6000 Low Range Hardness Analyser or approved equal		WS-H0502			
0294	0	AE-S701A	Hardness Analyser Element	Softened Water to Steam Boiler Analyser			120VAC			Contractor	Contractor			WS-H0502			
0295	0	WIT-S702	Drum Weigh Scale	Steam Boiler Water Amine Feed Drum Weight			120VAC			Contractor	Contractor	Eagle Microsystems DS750 or approved equal complete with suitable Digital Indicator Transmitter		WS-H0502			
0296	0	LS-S703A	Level Switch	Steam Boiler Condensate Tank Low Low Level			120VAC			Contractor	Contractor		I126	WS-H0502	WB-A0458		

**INSTRUMENT SPECIFICATION SHEETS**

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**1. GENERAL**

**1.1 References - General**

- .1 The Work includes the provision of all instrument specification sheets.
- .2 Refer to Section 17010 – Instrumentation and Control General Requirements for general instrumentation and control requirements related to instrument specification sheets.

**1.2 Instrument Specification Sheets**

- .1 Provide data sheets to itemize detailed as-built information regarding the specification of instruments included as part of this Work for each instrument supplied. The data sheets already included in this Section list specific minimum requirements for particular applications.
- .2 Use forms in accordance with the ISA Standard S20 as a template for the preparation of the specification sheets.

**2. PRODUCTS (NOT USED)**

**3. EXECUTION (NOT USED)**

**END OF SECTION**

**INSTRUMENT SPECIFICATION SHEETS**

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**INSTRUMENT SPECIFICATION NUMBER:** I100A

**DEVICE:** Magnetic Flow Meter

**TAG:** FIT-S235A, FIT-S250A

**SERVICE:** Sulphuric Acid (75-100%) feed pump discharge flow

**SIZE AND MATERIAL:** Size to be determined by pump skid designer

**END CONNECTIONS:** Flanged

**LINER MATERIAL:** PFA

**ELECTRODES:** Hastelloy C-276

**GROUNDING:** Hastelloy C-276 grounding rings

**RANGE:** 0-5 l/min

**INACCURACY:** ±1% of span

**OUTPUT:** 4 to 20 mADC into 500 ohm load  
Scaled pulse output

**POWER SUPPLY:** 120 VAC, 60 Hz

**INDICATION:** Local indication of flow rate and totalized flow

**ELECTRONIC ENCLOSURE:** NEMA 4X. Remote wall-mount.

**MANUFACTURER AND MODEL:** Rosemount 8700 Series  
ABB Magmaster  
Krohne  
Endress and Hauser.

**INSTRUMENT SPECIFICATION SHEETS**

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**INSTRUMENT SPECIFICATION NUMBER:** I100B

**DEVICE:** Magnetic Flow Meter

**TAG:** FIT-S165A, FIT-S185A

**SERVICE:** Ferric Chloride feed pump discharge flow

**SIZE AND MATERIAL:** Size to be determined by pump skid designer

**END CONNECTIONS:** Flanged

**LINER MATERIAL:** PFA

**ELECTRODES:** Tantalum

**GROUNDING:** Tantalum grounding rings

**RANGE:** 0-15 l/min

**INACCURACY:** ±1% of span

**OUTPUT:** 4 to 20 mA DC into 500 ohm load  
Scaled pulse output

**POWER SUPPLY:** 120 VAC, 60 Hz

**INDICATION:** Local indication of flow rate and totalized flow

**ELECTRONIC ENCLOSURE:** NEMA 4X. Remote wall-mount.

**MANUFACTURER AND MODEL:** Rosemount 8700 Series  
ABB Magmaster  
Krohne  
Endress and Hauser.

**INSTRUMENT SPECIFICATION SHEETS**

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**INSTRUMENT SPECIFICATION NUMBER:** I100C

**DEVICE:** Magnetic Flow Meter

**TAG:** FIT-S165A, FIT-S185A

**SERVICE:** Sodium Hydroxide feed pump discharge flow

**SIZE AND MATERIAL:** Size to be determined by pump skid designer

**END CONNECTIONS:** Flanged

**LINER MATERIAL:** PFA

**ELECTRODES:** Hastelloy C-276

**GROUNDING:** Hastelloy C-276 grounding rings

**RANGE:** 0-30 l/min

**INACCURACY:** ±1% of span

**OUTPUT:** 4 to 20 mADC into 500 ohm load  
Scaled pulse output

**POWER SUPPLY:** 120 VAC, 60 Hz

**INDICATION:** Local indication of flow rate and totalized flow

**ELECTRONIC ENCLOSURE:** NEMA 4X. Remote wall-mount.

**MANUFACTURER AND MODEL:** Rosemount 8700 Series  
ABB Magmaster  
Krohne  
Endress and Hauser.

**INSTRUMENT SPECIFICATION SHEETS**

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**INSTRUMENT SPECIFICATION NUMBER:** I100D

**DEVICE:** Magnetic Flow Meter

**TAG:** FIT-S430A, FIT-S440A

**SERVICE:** Ammonia feed pump discharge flow

**SIZE AND MATERIAL:** Size to be determined by pump skid designer

**END CONNECTIONS:** Flanged

**LINER MATERIAL:** PFA

**ELECTRODES:** Tantalum

**GROUNDING:** Tantalum grounding rings

**RANGE:** 0-2 l/min

**INACCURACY:** ±1% of span

**OUTPUT:** 4 to 20 mADC into 500 ohm load  
Scaled pulse output

**POWER SUPPLY:** 120 VAC, 60 Hz

**INDICATION:** Local indication of flow rate and totalized flow

**ELECTRONIC ENCLOSURE:** NEMA 4X. Remote wall-mount.

**MANUFACTURER AND MODEL:** Rosemount 8700 Series  
ABB Magmaster  
Krohne  
Endress and Hauser.

**INSTRUMENT SPECIFICATION SHEETS**

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<b>INSTRUMENT SPECIFICATION NUMBER:</b>	I105
<b>DEVICE:</b>	Flow Switch
<b>TAG:</b>	Refer to Section 17700 – Instrument Index
<b>TYPE:</b>	Thermal Dispersion
<b>SERVICE:</b>	Refer to Instrument Index and P&ID
<b>RANGE:</b>	Refer to Section 17700 – Instrument Index
<b>REPEATABILITY:</b>	<1%
<b>OUTPUT:</b>	SPDT contacts rated 10 Amps @ 120 VAC
<b>POWER SUPPLY:</b>	120 VAC, 60 Hz, 1 Ø
<b>ENCLOSURE:</b>	Polymer-coated aluminum, NEMA 4X rating
<b>MOUNTING:</b>	¾” NPT with 1” insertion length
<b>MANUFACTURER AND MODEL:</b>	IFM Weber



**INSTRUMENT SPECIFICATION SHEETS**

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<b>INSTRUMENT SPECIFICATION NUMBER:</b>	I111
<b>DEVICE:</b>	Pressure Transmitter (Gage and Absolute)
<b>TAG:</b>	Refer to Section 17700 – Instrument Index
<b>SERVICE:</b>	Refer to Instrument Index and P&ID Diagrams
<b>PROCESS CONNECTIONS:</b>	2” Pipe Flange mounting to tank
<b>RANGE:</b>	Refer to Section 17700 – Instrument Index
<b>INACCURACY:</b>	±1% of span
<b>OUTPUT:</b>	4 to 20 mADC into 500 ohm
<b>POWER SUPPLY:</b>	Loop powered 24 VDC
<b>CONSTRUCTION:</b>	Wetted parts to suit chemical application
<b>ELECTRONIC ENCLOSURE:</b>	NEMA 4X
<b>ACCESSORIES:</b>	Bleed/drain manifold
<b>MANUFACTURER AND MODEL:</b>	Rosemount Model 3051 ABB Foxboro

**INSTRUMENT SPECIFICATION SHEETS**

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<b>INSTRUMENT SPECIFICATION NUMBER:</b>	I115
<b>DEVICE:</b>	Pressure Switch
<b>TAG:</b>	Refer to Section 17700 – Instrument Index
<b>SERVICE:</b>	Refer to Instrument Index and P&ID
<b>PROCESS CONNECTION:</b>	½” NPTF
<b>SENSOR:</b>	Brass Bellows
<b>RANGE:</b>	Refer to Section 17700 – Instrument Index
<b>MOUNTING:</b>	Bottom, Stem mounted
<b>ENCLOSURE:</b>	NEMA 4X
<b>OUTPUT:</b>	Form C Contacts rated 5 amps @ 120 VAC
<b>MANUFACTURER AND MODEL:</b>	Ashcroft United Electric Barksdale

**INSTRUMENT SPECIFICATION SHEETS**

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**INSTRUMENT SPECIFICATION NUMBER:** I120

**DEVICE:** Liquid Level Transmitter

**TAG:** Refer to Section 17700 – Instrument Index

**TYPE:** Ultrasonic

**SERVICE:** Refer to Instrument Index and P&ID

**RANGE:** Refer to Section 17700 – Instrument Index

**INACCURACY:**  $\pm 0.5\%$  of span

**OUTPUT:** 4 to 20 mA DC into 500 ohm load  
5 configurable alarm relays

**POWER SUPPLY:** 120 VAC, 60 HZ

**ENCLOSURE:** NEMA 4X Transmitter Housing  
NEMA 4X Sensor

**MOUNTING:**  
(TRANSMITTER) Wall/ Stand Mount  
(SENSOR) Install sensors at least 300 mm above maximum liquid level.  
Provide PVC blind flange for mounting sensor.

**ACCESSORIES:** 1 - hand-held programmer

**MANUFACTURER AND MODEL:** Siemens Multiranger 100/200  
Magnetrol  
Endress & Hauser

**INSTRUMENT SPECIFICATION SHEETS**

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<b>INSTRUMENT SPECIFICATION NUMBER:</b>	I126
<b>DEVICE:</b>	Conductivity Level Switch
<b>TAG:</b>	Refer to Section 17700 – Instrument Index
<b>SERVICE:</b>	Refer to Instrument Index and P&ID
<b>RANGE:</b>	4 conductivity measuring ranges selectable via dip switches
<b>OUTPUT:</b>	SPDT Contacts
<b>POWER SUPPLY:</b>	120 VAC, 60 HZ
<b>ENCLOSURE:</b>	PBT Housing; Polypropylene rod insulation
<b>MOUNTING:</b>	Provide PVC blind flange for mounting probes.
<b>MANUFACTURER AND MODEL:</b>	Endress & Hauser

**INSTRUMENT SPECIFICATION SHEETS**

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<b>INSTRUMENT SPECIFICATION NUMBER:</b>	I131
<b>DEVICE:</b>	Temperature Indicating Transmitter with RTD Sensor
<b>TAG:</b>	Refer to Section 17700 – Instrument Index
<b>SERVICE:</b>	Refer to PIDs
<b>RANGE:</b>	0 - 100°C
<b>INACCURACY:</b>	±0.5% of span
<b>INDICATION:</b>	3½ Digit LED display scaled in engineering units
<b>OUTPUT:</b>	4 to 20 mA DC into 500 ohm load
<b>POWER SUPPLY:</b>	Loop powered
<b>ENCLOSURE:</b>	Transmitter: NEMA 4X RTD Probe: Platinum 100 OHM Spring Loaded
<b>MOUNTING:</b>	Direct to process, use a thermowell with 50 mm insertion at a pipe tee or elbow fitting or into a flange for tank mounting.
<b>MANUFACTURER AND MODEL:</b>	Rosemount Type 3044C ABB Foxboro

**END OF SECTION**

## INSTRUMENT LOOP DRAWINGS

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### 1. GENERAL

#### 1.1 References - General

- .1 Refer to Section 17010 – Instrumentation and Control General Requirements.

#### 1.2 Instrument Loop Drawings

- .1 The following sixteen (12) Drawings show typical instrument loop wiring diagrams as referenced by this Specification Section. One (1) Drawing per loop shall be completed by the Contractor and submitted for approval after award of Contract.

WS-A0451	Instrument Loop Diagram - Typical Motorized Valve - Open/Close 120V (Rotork IQ Type)
WS-A0453	Instrument Loop Diagram - Typical Magnetic Flow Meter
WS-A0454	Instrument Loop Diagram - Typical Motorized Valve - Open/Close 120V with local control panel (Rotork ROM Type)
WS-A0455	Instrument Loop Diagram - Typical Motorized Valve - Open/Close 120V (Rotork ROM Type)
WB-A0451	Instrument Loop Diagram - Typical Motorized Valve - Open/Close 600V
WB-A0455	Instrument Loop Diagram – Typical Ultrasonic Level Transmitter
WB-A0458	Instrument Loop Diagram - Typical Conductivity Level Switch – Single Point
WB-A0461	Instrument Loop Diagram - Typical MCC Starter
WB-A0463	Instrument Loop Diagram - Typical Discrete Input
WB-A0464	Instrument Loop Diagram - Typical Valve Limit Switch Monitoring
WB-A0465	Instrument Loop Diagram - Typical Loop Powered Analog Input
WB-A0466	Instrument Loop Diagram - Typical 3-wire RTD

### 2. PRODUCTS (NOT USED)

### 3. EXECUTION (NOT USED)

**END OF SECTION**

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**INSTRUMENT STANDARD DETAILS**

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**1. GENERAL**

**1.1 References – General**

- .1 Refer to Section 17010 – Instrumentation and Control General Requirements.

**1.2 Instrument Standard Details**

- .1 The following eight (8) Drawings provide standard instrumentation installation details as referenced by this Specification Section:

WB-A0401	Instrumentation Standard Details - Ultrasonic Level Transducer
WB-A0402	Instrumentation Standard Details - Loop Powered Remote Indicating Transmitter
WB-A0403	Instrumentation Standard Details – Hand Switch Mounting
WB-A0404	Instrumentation Standard Details – Pressure Gauge
WB-A0405	Instrumentation Standard Details – Pressure Switch
WB-A0406	Instrumentation Standard Details – Float Switch
WB-A0407	Instrumentation Standard Details – Thermowell Mounted RTD
WB-A0408	Instrumentation Standard Details – Pressure Transmitter and Inline Pressure Sensor

**2. PRODUCTS (NOT USED)**

**3. EXECUTION (NOT USED)**

**END OF SECTION**